

Draft Biological Assessment

for Revised Shoshone National Forest Land and Natural Resource Management Plan

Prepared by:

Joe Harper
Forest Wildlife Biologist

for:

Shoshone National Forest
Rocky Mountain Region

Date Completed _____

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TTY). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, SW, Washington, DC 20250-9410, or call (800) 795-3272 (voice) or (202) 720-6382 (TTY). USDA is an equal opportunity provider and employer.

Table of Contents

1.0	Introduction	1
	Consultation History	1
2.0	Project Area	1
3.0	Description of Proposal	3
4.0	Alternatives	4
5.0	Threatened, endangered, proposed and candidate species considered	6
6.0	Consultation History	7
7.0	Species status	11
	Grizzly bear	11
	Gray wolf	20
	Canada lynx	24
8.0	Environmental baseline for the species evaluated	27
	Status of the Grizzly Bear on the Shoshone National Forest (Action Area)	27
	Status of the Gray Wolf	42
	Status of the Canada Lynx and Critical Habitat on the Shoshone National Forest (Action Area)	44
9.0	Effects of action and determination of the effects	48
	Grizzly bear	48
	Effects on grizzly bear/human interactions	49
	Gray Wolf	55
	Canada Lynx and Canada Lynx Critical habitat	56
10.0	Literature Cited	1

List of Tables

Table BA- 1.	Acres of management areas by alternative	5
Table BA- 2.	Threatened, endangered, proposed, and candidate species and their habitats	7
Table BA- 3.	Determinations from the 2003 biological assessment	9
Table BA- 4.	Determinations from the 2010 biological assessment	10
Table BA- 5.	All Greater Yellowstone Ecosystem bear mortalities, 1973–2011	15
Table BA- 6.	Grizzly bear human-caused mortalities on all National Forest System lands within the Greater Yellowstone Area 2003–2010 (IGBST 2003–2011)	16
Table BA- 7.	Grizzly bear human-caused mortalities on the Shoshone 2003–2011 (IGBST 2003–2011)	16
Table BA- 8.	Wolf depredations in Wyoming: 2000—2011 (Jimenez et al. 2012)	24
Table BA- 9.	1998 Baseline and 2010 for secure habitat for bear management unit (BMU) subunit on the Shoshone National Forest	40
Table BA- 10.	Grizzly bear conflicts on the Shoshone NF, 2003 to 2011 (IGBST 2003—2011)	41
Table BA- 11.	Documented grizzly bear/livestock conflicts, Shoshone National Forest (2003–2011) (WGFD 2003–2011)	41
Table BA- 12.	Composition of confirmed wolf packs on the Shoshone National Forest in 2011 (Jimenez et al. 2012)	42
Table BA- 13.	Canada lynx habitat and critical habitat acres by lynx analysis unit	47
Table BA- 14.	Grizzly bear denning habitat in thousands of acres, closed to snow machine use within)the PCA, Shoshone National Forest	49
Table BA- 15.	The 1998 baseline for numbers of developed sites on the Shoshone National Forest within each bear management unit	50

List of Figures

Figure BA- 1. Yellowstone Grizzly Bear Distinct Population Segment (DPS) Boundary and Suitable Habitat	12
Figure BA- 2. Wyoming wolf pack home ranges 2011 (Jimenez et al. 2012)	23
Figure BA- 3. Canada lynx critical habitat – Unit #5-Greater Yellowstone Area.....	26
Figure BA- 4. Grizzly bear primary conservation area (recovery zone) and bear management units, Shoshone National Forest	31
Figure BA- 5. Grizzly bear primary conservation area (recovery zone), occupied habitat and commercial livestock grazing allotments, Shoshone National Forest	33
Figure BA- 6. Grizzly bear secure habitat, Shoshone National Forest.....	39
Figure BA- 7. Population trends for elk herd units that encompass the Shoshone National Forest	43
Figure BA- 8. Canada lynx analysis units and habitat (including critical habitat), Shoshone National Forest	46

1.0 Introduction

This biological assessment documents the evaluation of potential effects of the Proposed Draft Plan and alternatives, Shoshone National Forest (the Shoshone) on threatened endangered, proposed and candidate (TEPC) species known to occur on the Forest. Forest Service policy on TEPC species is found in Forest Service Manual 2670.31. This assessment was prepared in accordance with Section 7 of the Endangered Species Act (ESA) as amended (50 CFR 402.13), and Forest Service Manual 2672.42. Section 7 of the Endangered Species Act directs Federal departments and agencies to ensure actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of their critical habitats (16 USC 1536, 2009).

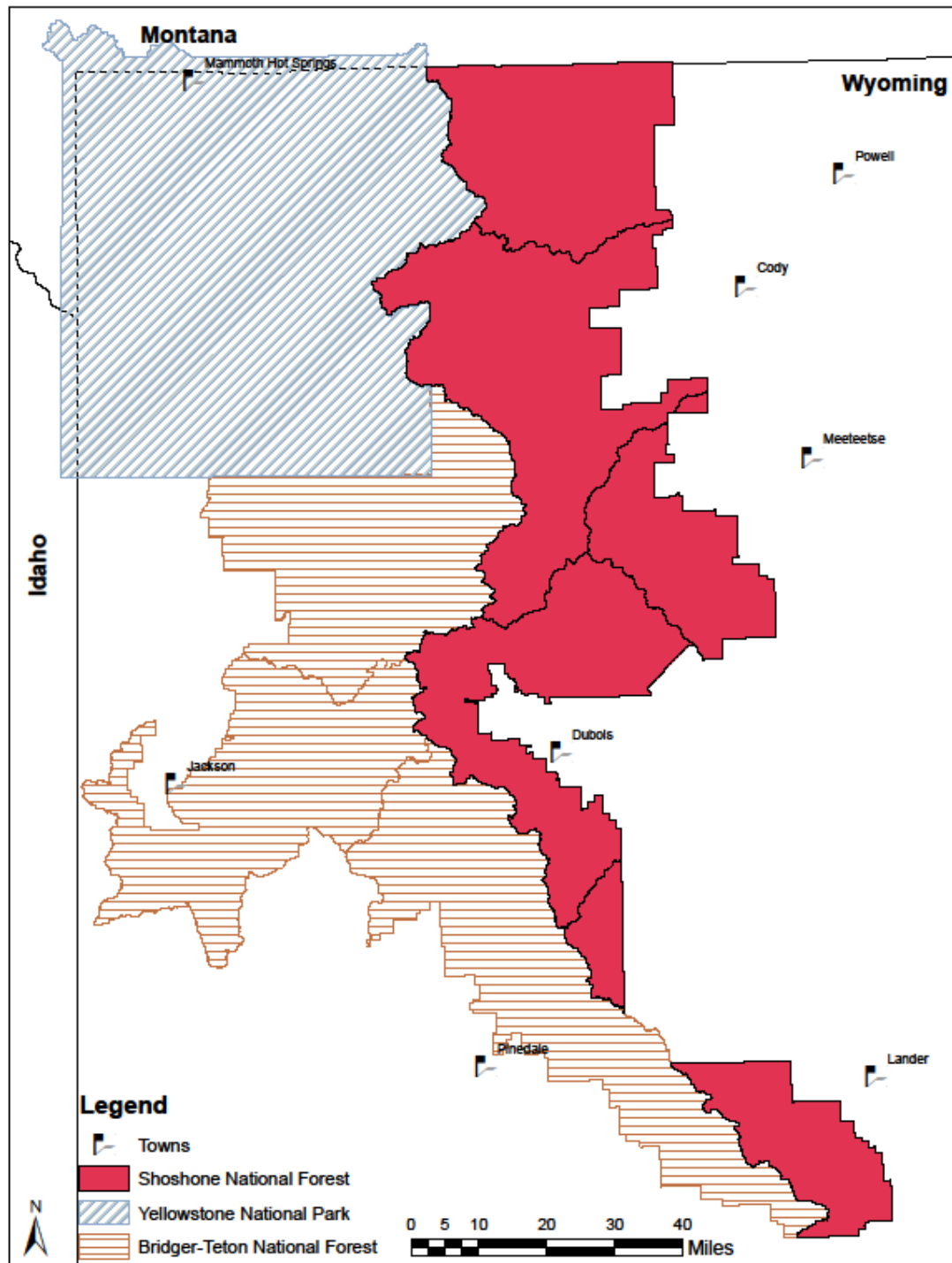
Consultation History

Two programmatic formal consultations have occurred recently with the U.S. Fish and Wildlife Service (USFWS). In April 2011, a Forest-wide biological assessment was prepared on existing outfitter and guide special use permits on the Shoshone. A programmatic biological opinion (ES-61411/WY11F0215) was received on March 21, 2012, from the USFWS. The biological opinion acknowledged the Shoshone's determination of "no effect" to the threatened Canada lynx and designated critical habitat for lynx. The biological opinion concurred with the Shoshone's determination of "not likely to jeopardize the continued existence" of the non-essential experimental population of gray wolf. The biological opinion also acknowledged the "likely to adversely affect" determination for the threatened grizzly bear by providing the Shoshone incidental take. Reasonable and prudent measures, terms and conditions, and conservation recommendations in the biological opinion were incorporated into the Shoshone outfitter and guides special use permits.

In May 2011, a Forest-wide biological assessment was prepared on commercial livestock grazing on the Shoshone. A programmatic biological opinion (06E13000/WY11F0246) was received on March 6, 2012, from the USFWS. The biological opinion concurred with the Shoshone's determinations of "may affect, not likely to adversely affect" the threatened Canada lynx and designated critical habitat for lynx, and "not likely to jeopardize the continued existence" of the non-essential experimental population of gray wolf. The biological opinion went on to address the "likely to adversely affect" determination for the threatened grizzly bear by providing the Shoshone incidental take. Reasonable and prudent measures, terms and conditions, and conservation recommendations in the biological opinion were incorporated into the Shoshone grazing program.

2.0 Project Area

The Shoshone National Forest boundary encompasses the project area; located in the middle Rocky Mountains in northwest Wyoming (see Map BA- 1).



Map BA- 1. Shoshone National Forest, planning area boundary

The Shoshone consists of 2.4 million acres in Fremont, Hot Springs, Park, Sublette, and Teton Counties, and is part of the Greater Yellowstone Area. The Greater Yellowstone Area consists of about 13 million acres of public lands managed by the USDA Forest Service, National Park Service, and U.S. Fish and Wildlife Service. It includes six national forests (Beaverhead-

Deerlodge, Bridger-Teton, Caribou-Targhee, Custer, Gallatin, and Shoshone), three national parks (Grand Teton, Yellowstone, and John D. Rockefeller, Jr. Memorial Parkway), and two national wildlife refuges (National Elk Refuge and Red Rock Lakes). The Greater Yellowstone Area is one of the last remaining large, nearly intact ecosystems in the northern temperate zone.

On the Shoshone, terrain varies widely from sagebrush flats to rugged mountains because the Shoshone is situated on the western edge of the Great Plains and the eastern side of the Continental Divide. Elevations on the Shoshone range from 4,600 feet at the mouth of Clarks Fork Canyon to 13,804 feet on Gannett Peak, Wyoming's highest point. The higher mountains are snow clad most of the year with immense areas of exposed rock interspersed with meadows and forests.

Most of the Shoshone is within the upper Missouri River Basin, subdivided by the Wind/Big Horn and Clarks Fork of the Yellowstone River basins. The southern tip of the Shoshone is in the Sweetwater drainage, which flows into the Platte River system. Principal rivers within the Shoshone boundary are the Clarks Fork of the Yellowstone River, North and South Forks of the Shoshone River, and the Greybull, Wind/Big Horn, and Popo Agie Rivers.

Annual precipitation varies with topography and elevation, ranging from 15 to 70 inches. The higher elevations receive from 30 to 40 percent of their annual precipitation during the winter in the form of snow, roughly 40 percent as rain and snow in the spring, and 20 to 30 percent as rain in the summer and fall.

3.0 Description of Proposal

The Shoshone National Forest Land and Resource Management Plan (1986) is being revised. Since 1986, the Forest Plan has been amended 14 times. Land use plans provide broad guidance and information needed for project and activity decision-making. This Plan will guide relevant resource management programs, practices, uses, and protection measures. The associated environmental impact statement (EIS) examines potential environmental effects that could occur as a result of implementing projects associated with the land use plan.

The key decisions made in this integrated plan for long-term management of Shoshone are:

- It establishes Forest-wide multiple-use goals and objectives.
- It establishes Forest-wide standards and guidelines applying to future activities and resource integration requirements.
- It establishes management area direction (management area prescriptions) applying to future activities in a management area.
- It meets the requirements for additional planning for special areas unless inconsistent with special area authorities.
- It designates land as suited or not suited for timber production and other resource management activities such as rangeland and recreation management.
- It establishes monitoring and evaluation requirements.
- It recommends the establishment of wilderness, wild and scenic rivers, and other special designations to Congress, as appropriate.

4.0 Alternatives

Six revision/issue topics drove the development of the six alternatives.

Issue 1. Recreation Uses and Opportunities.

Issue 2. Special Areas and Designations.

Issue 3. Vegetation Management.

Issue 4. Wildlife Habitat Management.

Issue 5. Minerals.

Issue 6. Commercial Livestock Grazing.

Alternative A (No Action): Alternative A is the continuation of present management under the existing 1986 Land and Resource Management Plan and its amendments. It meets requirements of the National Environmental Policy Act that a no-action alternative be considered. “No action” means that current management practices based on existing land use plans and other management decision documents would continue.

This alternative proposes to provide for the protection of federally listed species and their habitats using best available science and the *Northern Rockies Lynx Management Direction 2007* (NRLMD) that amended forest plans.

Alternative B: Preliminary proposed action. Alternative B provides a balanced response to the issues raised during revision, continues management that is working, and adjusts, to the extent possible, to be responsive to the issues raised by the public.

This alternative proposes to provide for the protection of federally listed species and their habitats using best available science, the Northern Rockies Lynx Management Direction 2007 and it specifically incorporates the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007*. This alternative proposes to add 2,130 acres of precommercial thinning in lynx habitat that was not brought forward in the NRLMD.

Alternative C: High wilderness and back country non-motorized recreation. Alternative C demonstrates the most amount of land allocated for wilderness, with no motorized use in remaining inventoried roadless areas.

This alternative proposes to provide for the protection of federally listed species and their habitats the same as alternative B. This alternative proposes to add 2,130 acres of precommercial thinning in lynx habitat that was not brought forward in the NRLMD.

Alternative D: Back country and non-motorized emphasis. Alternative D provides back country and non-motorized uses, while maintaining moderate to low levels of commodity production. This alternative also addresses issues raised by the public and conservation groups.

This alternative proposes to provide for the protection of federally listed species and their habitats the same as alternative B. This alternative proposes to add 2,130 acres of precommercial thinning in lynx habitat that was not brought forward in the NRLMD.

Alternative E: Commodity and motorized use emphasis. Alternative E provides commodity production and motorized use while addressing issues shared by the public, local industry, and motorized user groups.

This alternative proposes to provide for the protection of federally listed species and their habitats the same as alternative B. This alternative proposes to add 2,130 acres of precommercial thinning in lynx habitat that was not brought forward in the NRLMD.

Alternative F: High commodity and motorized use emphasis. Alternative F demonstrates the highest level of commodity production and motorized use possible within parameters, such as designated wilderness.

This alternative proposes to provide protection of federally listed species and their habitats by incorporating most of the *Northern Rockies Lynx Management Direction 2007* and most of the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007*.

This alternative also proposes to add 2,130 acres of precommercial thinning in lynx habitat that was not brought forward in the NRLMD and remove winter snow compaction direction in lynx habitat.

The differences between the six alternatives and their potential to affect sensitive species can be analyzed by the different management areas with which they are associated. Management areas outline uses and activities that may occur in them. All Shoshone National Forest System lands have been allocated to one of 25 management areas that range from areas where more wilderness and back country non-motorized is emphasized to areas that are more intensely managed. In general, those alternatives that allow a higher level of management intensity may require a higher level of management attention to the protection and maintenance of habitats for species that are sensitive to habitat alteration and/or human disturbances. A summary of the differences in management areas by alternative is displayed below (Table BA- 1).

Table BA- 1. Acres of management areas by alternative

MgmtArea	Description	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
1.1	Wilderness	1,358,592	1,358,592	1,358,592	1,358,592	11,358,592	1,358,592
1.1A	Glacier Addition	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563	6,563 6,563
1.2	Recmnd Wilderness			584,734	165,587		
1.2A	Recmnd High Lakes Wldrnss			15,224			
1.2B	Recmnd Dunoir Wldrnss			28,879	28,879		
1.3	Back Cntry NonMotorized	455,554	358,127	106,890	395,123	327,549	203,587
1.5A	Clarks Fork Wild River	6,924	6,924	3,350	6,924	6,924	6,924
1.6A	High Lakes WSA	15,224	15,224		15,224	15,224	15,224
1.6B	Dunoir SMU	28,879	28,879			28,879	28,879

Table BA- 1. Acres of management areas by alternative

MgmtArea	Description	Alt A	Alt B	Alt C	Alt D	Alt E	Alt F
2.2A	Line Creek RNA	1,278	1,278	186	1,278	1,278	1,278
2.3	Proposed RNA	1,386	12,127	4,298	15,201		
3.1A	Swamp Lake SIA	581	581	581	581	581	581
3.1B	Prpsd Little Popo Agie SIA		1,714	1,714	31,714		
3.1C	Prpsd Sawtooth Peatbeds SIA		648		648		
3.3A	Back Cntry Motorized	185,936	64,243	4,948	8,333	90,500	175,296
3.3B	Back Cntry Winter Motorized		86,413	3,157	75,068	43,485	5
3.3C	Back Cntry Summer Motorized		72,735	4,936	11,500	98,030	4,563
3.5	Back Cntry Rec & Restoration		66,427				
4.2	Travel Corridor	164,447	100,883	82,588	100,883	103,422	103,901
4.3	Back Cntry Access Corridor		13,982	5,120	13,947	8,775	3,349
4.5A	Prpsd Kirwin SIA	481	481	481	481	481	
5.1	Mngd Forests & Rangelands	157,215	173,116	72,298	168,350	253,717	528,146
5.2	Public Water Supply		12,868	6,841	7,953	12,868	
5.4	Mngd Big Game Crucial Winter Rng	54,972	55,079	145,505	54,057	80,016	
8.2	Ski-based Resort		1,145	1,145	1,145	1,145	1,145
	Totals	2,438,030	2,438,029	2,438,029	2,438,029	2,438,029	2,438,029

Alternative A management areas assigned to the nearest equivalent revised plan management area

5.0 Threatened, endangered, proposed and candidate species considered

Threatened, endangered, proposed and candidate species that occur, or could occur, in the planning area appear in Table BA- 2. The grizzly bear and Canada lynx are currently listed as

threatened species. The gray wolf population in the Greater Yellowstone Area, which includes the Shoshone, is classified as a non-essential/experimental population. The three candidate species include the American wolverine, greater sage-grouse, and whitebark pine. (Forest Service Rocky Mountain Region Policy is to add candidate species to the Regional Forester's sensitive species list. These species are analyzed in the appropriate biological evaluation for sensitive species.) Currently there are no endangered or proposed species on the Shoshone.

Table BA- 2. Threatened, endangered, proposed, and candidate species and their habitats

Species	Status	Global/State ranking ¹	Habitat
Mammal species			
Gray wolf (<i>Canis lupus</i>)	Non-essential/ experimental	G4/S1	Variable, Ungulate winter range
Canada lynx (<i>Lynx canadensis</i>)	Threatened	G5/S1	Mature forest
Canada lynx Critical Habitat	Designated		Boreal forest landscapes in Fremont, Park, Sublette and Teton Counties
Grizzly bear (<i>Ursus arctos horribilis</i>)	Threatened	G4/S1	Montane forests
North American wolverine (<i>Gulo gulo luscus</i>)	Candidate	G4/S2	Subalpine to alpine
Bird species			
Greater sage-grouse (<i>centrocercus urophasianus</i>)	Candidate	G4/S4	Sagebrush communities
Plant species			
Whitebark pine (<i>Pinus albicaulis</i>)	Candidate	G5/S3	Cold and windy subalpine to alpine sites above 8,000 ft. elevation

¹ Conservation status ranks estimate a species risk of elimination. Status ranks are based on a 1 to 5 scale, 1 denoting a species is critically impaired and 5 denoting a species is secure. Species status is assessed at three geographic scales: global (G), national (N), and state/province (S). The overall status of a species is denoted by its G-rank, while its condition in a particular country is denoted by its N-rank, and its condition in a particular state/province is denoted by its S-rank. State rank is assigned by Wyoming Natural Diversity Database biologists and denotes a species probability of elimination in Wyoming. Subspecies, varieties, or any other designation below the level of a global ranked species, receives a T-rank that denotes their conservation status. A species may receive a B- or N-rank that refers to the conservation status of the breeding (B) or non-breeding (N) population in a particular nation or state/province. (NatureServe, February 2012, Wyoming Natural Diversity Database February 2012).

6.0 Consultation History

Consultation prior to the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area* with excerpts from the original biological assessment (USDA Forest Service 2003).

The *Interagency Grizzly Bear Guidelines (Guidelines)* (Interagency Grizzly Bear Committee 1986) are a key aspect of established policy for grizzly management on the Shoshone. They were initially developed for the Greater Yellowstone Area in the late 1970s as a tool for evaluating and implementing land management decisions (Mealey 1979). Following extensive reviews by participating land management agencies during the early 1980s, modified *Guidelines* were submitted to the U.S. Fish and Wildlife Service (USFWS) for formal consultation relative to all

Forest Service, Bureau of Land Management (BLM), and National Park Service (NPS) lands throughout grizzly bear ecosystems in the states of Idaho, Montana, Washington, and Wyoming. Subsequently, the USFWS returned a biological opinion stating, "...implementation of the guidelines will promote conservation of the grizzly bear" (Interagency Grizzly Bear Committee 1986).

The Shoshone formally implemented guidelines relative to the grizzly bear in 1979. In 1984, livestock permits authorizing allotments within the grizzly bear recovery area and within occupied habitat were amended to include permit terms and conditions for the grizzly bear. This was completed to minimize the potential for grizzly bear/human conflicts, minimize depredation on livestock, and contribute to the conservation of the grizzly bear. This occurred simultaneously with implementation of the attractant storage order.

In the mid-1990s, a programmatic biological assessment process was developed to assess the effects of livestock grazing on threatened, endangered, and experimental species in the Northern and Rocky Mountain Regions of the Forest Service. The Shoshone was included in this effort in the Rocky Mountain Region for the endangered black-footed ferret and whooping crane (McDonald 1995, Isdahl 1995, Barber 1995). For the grizzly bear, bald eagle, and gray wolf, the Shoshone was included with other Greater Yellowstone Area national forests in a cooperative process with the Northern Region of the Forest Service (Puchlerz 1995, Stangl and Maj 1995, Gore 1995).

Inclusion with the Northern Region made sense ecologically and served to facilitate an ecosystem management approach for these species. The black-footed ferret and whooping crane were not included in the Northern Region effort as these species were not an issue in all Northern Region and Greater Yellowstone Area forests.

Programmatic biological assessments (including an allotment specific decision framework) for the grizzly bear, bald eagle, and gray wolf were reviewed by the Helena and Cheyenne offices of the USFWS and approved as the basis for making allotment specific determinations. The black-footed ferret and whooping crane programmatic assessments used a slightly different approach whereby the determination of effects was made and merely disclosed in the programmatic document. All six of these documents included species write-ups, assessments of potential effects from grazing, and recommended mitigations where necessary. Programmatic assessments are not included in this document, but can be obtained from the Shoshone National Forest Supervisor's Office in Cody, Wyoming.

The Canada lynx was listed in March 2000, after the livestock grazing programmatic assessments of listed species were completed. Consultation on the Shoshone's ongoing activities, which included livestock grazing, did occur for the lynx in the summer of 2000. The USFWS concurred with the "no effect or not likely to adversely affect" determinations for the grazing allotments on the Forest. Because consultation was completed, lynx were not addressed in the original biological assessment (USDA Forest Service 2003).

In 1996, consultation occurred on a Shoshone National Forest proposal to reissue grazing permits and formulate management plans on 36 livestock allotments. Concurrence with the determination of "not likely to adversely affect" for grizzly bear was received from the USFWS on 33 of the 36 allotments; concurrence was not received for the other three allotments, due to concerns for conflict between domestic sheep grazing and grizzly bears. Since that time, those three active sheep allotments were vacated, resulting in 10 allotments that previously allowed sheep grazing to become vacant. On January 9, 2003, a decision was made and documented in a Decision

Notice that all 10 vacant sheep allotments on the north zone ¹ of the Shoshone will remain vacant indefinitely, and no permits for the grazing of domestic sheep will be issued in those allotments.

In April 2003, and with grizzlies as a listed species, the Shoshone finalized a biological assessment (USDA Forest Service 2003) that analyzed the effects of the livestock grazing program on the entire Forest. The effects determination in the biological assessment was that the grazing program had an adverse effect on grizzlies as mortalities, mostly in the form of management removals, are associated with livestock grazing. The Shoshone entered into formal consultation with USFWS, and a biological opinion (WY7155) with incidental take of two grizzly bears [with no more than one being an adult female, and no more than one within the 10-mile zone (including the recovery zone)] was issued by the USFWS in 2004. Recommendations (terms and conditions) from the 2004 biological opinion were incorporated in the Shoshone grazing program and have been effective in minimizing livestock/bear conflicts. A summary of the determination of effects on listed species in the 2003 biological assessment is listed in Table BA-3.

Table BA- 3. Determinations from the 2003 biological assessment

Species	Status	Determination
Gray wolf (<i>Canis lupus</i>)	Non-essential	Not likely to jeopardize
Canada lynx (<i>Lynx canadensis</i>)	Threatened	Not addressed as it was analyzed in March 2000
Grizzly bear (<i>Ursus arctos horribilis</i>)	Threatened	Likely to adversely affect
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Threatened	No effect

The Northern Rockies Lynx Management Direction EIS ROD (NRLMD) was signed in March 2007 (USDA Forest Service 2007). The purpose of the NRLMD was to incorporate management direction into land and management plans that conserve and promote the recovery of lynx in the Northern Rockies Ecosystem. The direction applies to National Forest System lands presently occupied by lynx (Shoshone National Forest included).

Consultation post *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*.

In April 2007, the grizzly bear was removed from the threatened species list. At that time, the grizzly bear, in Region 2 of the Forest Service, was considered a sensitive species and effects were analyzed in project-level biological evaluations. Between 2007 and September 2009, as individual allotments came up for their 10-year permit renewal, the 2004 biological opinion (WY7155) was tiered to and terms and conditions from the biological opinion were incorporated into biological evaluations and permits along with the best available science direction in the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area*. No consultation was needed for a sensitive species.

Grizzly bears in the Greater Yellowstone Ecosystem were relisted as a threatened species in September 2009. A batched informal consultation (USDA Forest Service, 2010) occurred in

¹ Five ranger districts comprise the Shoshone National Forest: Clarks Fork, Greybull, Wapiti, Washakie, and Wind River. The Clarks Fork, Greybull, and Wapiti Ranger Districts are administratively combined and known informally as the “north zone” of the Forest; the Washakie and Wind River Ranger Districts are known informally as the “south zone.”

March 2010, for projects that had decisions made between the de-listing (2007) and re-listing of the grizzly bear (2009), and were either on-going actions or had not been completely implemented. No grazing allotments needed this batched consultation. The USFWS concurred with the informal consultation (WY10I0249).

In June 2010, an addendum (USDA Forest Service, 2010b) to the 2003 biological assessment was prepared. It incorporated grazing management options into the programmatic 2003 biological assessment that allowed for flexibility in making changes to how livestock were managed on a particular allotment. A summary of the determination of effects on listed species in the June 2010 biological assessment are listed in Table BA- 4.

Table BA- 4. Determinations from the 2010 biological assessment

Species	Status	Determination
Gray wolf (<i>Canis lupus</i>)	Non-essential	Not likely to jeopardize
Canada lynx (<i>Lynx canadensis</i>)	Threatened	Not addressed as it was analyzed in March 2000
Grizzly bear (<i>Ursus arctos horribilis</i>)	Threatened	Likely to adversely affect

The USFWS concurred with a written agreement to the biological assessment in July 2010 (WY10I0305). The USFWS also “encouraged” the Shoshone to reinitiate consultation at the programmatic level due to the take of one adult male grizzly bear in 2008, within the 10-mile buffer zone boundary identified in the 2004 biological opinion. The Forest did not reinitiate as encouraged at that time.

In August 2010, an adult male and an adult female grizzly bear were taken on the Wind River/Warm Springs (Sheridan Basin) combined allotments as a result of livestock grazing. Two cubs with the adult female were relocated. Both of these take were within the 10-mile buffer zone boundary. Cumulatively, this makes three bears taken since the 2004 biological opinion. At this time, the Shoshone had exceeded its allotted 2004 take and consultation was reinitiated with the USFWS on August 18, 2010. Causes of the take and options on how to resolve anticipated additional bear/livestock conflicts were discussed. Between August 26 and September 8, consultation among the USFWS, the Shoshone, Wyoming Game and Fish, and grazing permittees occurred, addressing options to reduce bear/livestock conflicts as there were still bears in the area. Livestock were eventually moved into the Moccasin Basin pasture (Wind River/Warm Springs Allotment) due to the lack of bear activity, for the rest of the grazing season. No additional grizzly bears were removed in 2010 as a result of livestock grazing.

As a result of exceeding take and reinitiating consultation, in May 2011, an amendment to the 2003 Biological Assessment for Commercial Livestock Grazing on the Shoshone was prepared (USDA Forest Service 2011a). In 2012, the USFWS issued a biological opinion (WY11F0246) with incidental take of a maximum of 6 grizzly bear mortalities on the North Zone and 10 grizzly bear mortalities on the South Zone. Recommendations (terms and conditions) from the 2012 biological opinion were incorporated into the Shoshone grazing program.

Consultation for this Revised Forest Plan will be for the entire inclusion or not of the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area and the Northern Rockies Lynx Management Direction* EIS ROD (March 2007). This is not initiating consultation on the NRLMD.

7.0 Species status

Grizzly bear

Status of the Grizzly Bear in the Greater Yellowstone Ecosystem

The grizzly bear population in the Yellowstone geographic area is hereafter referred to synonymously as the Greater Yellowstone Ecosystem, Greater Yellowstone Area, or Yellowstone Grizzly Bear Ecosystem.

On March 29, 2007, the USFWS established a distinct population segment of the grizzly bear for the Greater Yellowstone Area and the surrounding area (Figure BA- 1) and removed this DPS (Yellowstone grizzly bear population) from the List of Threatened and Endangered Wildlife (USDI Fish and Wildlife Service 2007). According to this ruling, robust population growth, coupled with State and Federal cooperation to manage mortality and habitat, widespread public support for grizzly bear recovery, and the development of adequate regulatory mechanisms had brought the Yellowstone grizzly bear population to the point where making a change to its status was appropriate.

Prior to the publication of this final rule, the USFWS (1) finalized the Conservation Strategy that would guide post-delisting monitoring and management of the grizzly bear in the GYA, (2) appended the habitat-based recovery criteria to the 1993 Recovery Plan and Strategy, and (3) appended an updated and improved methodology for calculating total population size, known to unknown mortality ratios and sustainable mortality limits for the Yellowstone grizzly bear population to the 1993 Recovery Plan and Conservation Strategy.

On September 21, 2009, the Federal District Court in Missoula issued an order enjoining and vacating the delisting of the Yellowstone grizzly bear population. In compliance with this order, the Yellowstone grizzly population is once again a threatened population under the Endangered Species Act (USDI Fish and Wildlife Service 2010a). Conversations between Forest Service representatives and the USFWS began promptly after the relisting of the grizzly bear to identify ongoing activities that may need consultation under Section 7 of the ESA. A batched informal consultation (USDA Forest Service 2010a) occurred in March 2010 for projects that had decisions made between the de-listing (2007) and re-listing of the grizzly bear (2009) and were either on-going actions or had not been completely implemented. Forest Plan revision was not submitted during this batched consultation effort.

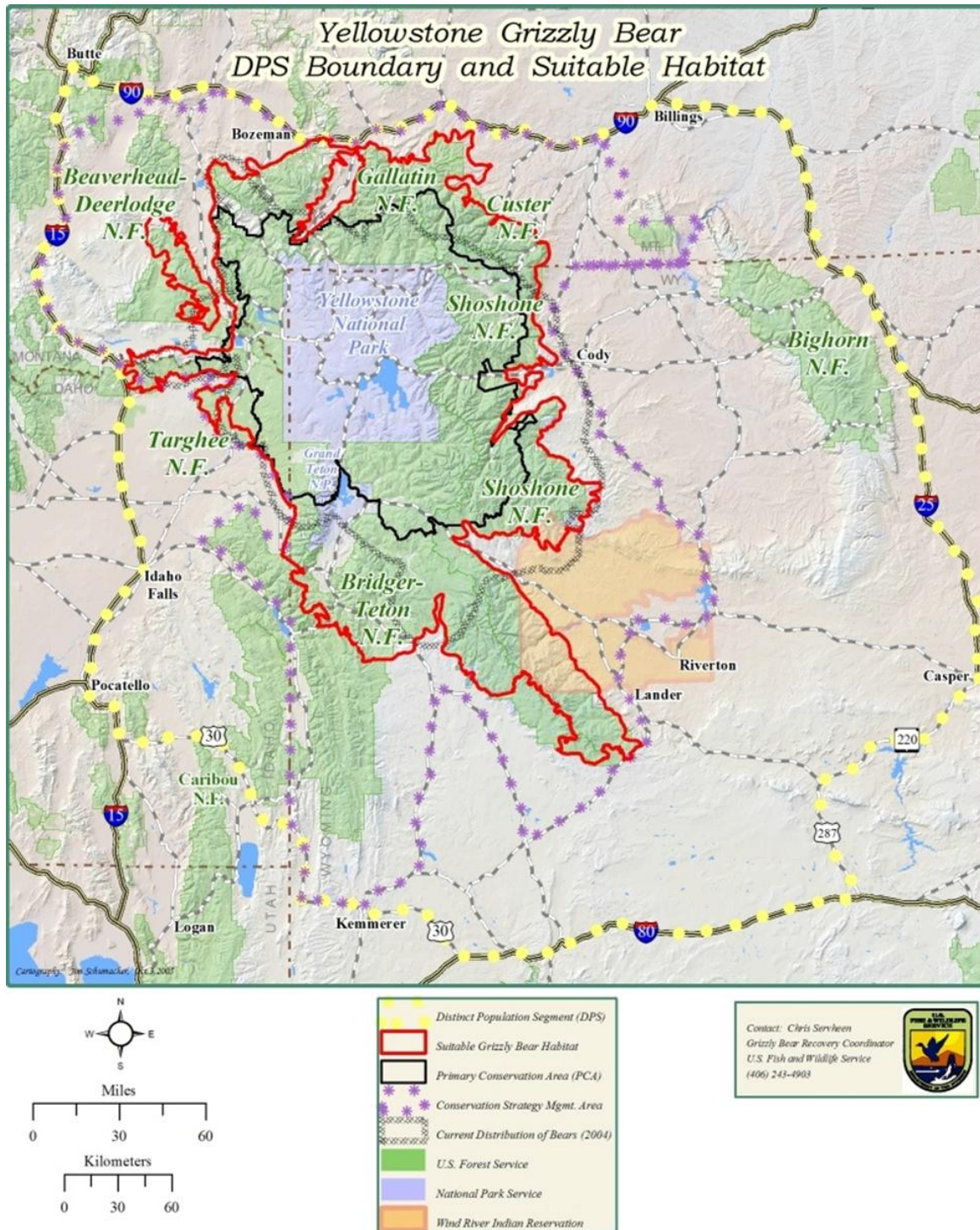


Figure BA- 1. Yellowstone Grizzly Bear Distinct Population Segment (DPS) Boundary and Suitable Habitat

Home Range Size

Home range sizes of grizzly bears vary in relation to food availability, weather conditions, and interactions with other bears. In addition, individual bears may extend their range seasonally or from one year to the next (USDI Fish and Wildlife Service 1993) and the home ranges of adult

grizzly bears frequently overlap. The home ranges of adult male grizzlies are generally two to four times larger than that of females, averaging in approximately 884 square kilometers (341 square miles) for females and 3,757 square kilometers (1,450 square miles) for males (Blanchard and Knight 1991). The home ranges of grizzly females appear to be smaller while they are with cubs, but ranges expand when the young are yearlings to meet increased foraging demands.

Grizzly bears disperse as subadults and their pattern of dispersal is not well documented. Dispersing young males apparently leave their mothers' home ranges and their dispersal may be mediated by the avoidance of the home ranges of established adults. Young females may establish a home range soon after family breakup, often within the vicinity of their mothers' home ranges. Grizzly bear mothers may tolerate female offspring and may shift their home ranges to accommodate them (USDI Fish and Wildlife Service 1993).

Food Habits

Although the digestive systems of bears are essentially that of carnivores, bears are successful omnivores, and in some areas may be almost entirely herbivorous. Bears feed on animal matter or vegetable matter that is highly digestible and high in starch, sugars, protein, and stored fat. Grizzly bears must avail themselves of foods rich in protein or carbohydrates in excess of maintenance requirements in order to survive denning and post-denning periods. Other plant materials are eaten as the plants emerge, when crude protein levels are highest. Grizzly bears are opportunistic feeders and will prey or scavenge on almost any available food including ground squirrels, ungulates, carrion, and garbage. In areas where animal matter is less available, roots, bulbs, tubers, fungi, and tree cambium may be important in meeting nutrient requirements. High quality foods such as berries, nuts, and fish are important in some areas.

The search for food has a primary influence on grizzly bear movements. Upon emergence from the den, they seek lower elevations, drainage bottoms, avalanche chutes, and ungulate winter ranges where their food requirements can be met. Throughout late spring and early summer, they follow plant maturity back to higher elevations. In late summer and fall, there is a transition to fruit and nut sources, as well as other plant materials. This is a generalized pattern, however, and it should be kept in mind that bears are individuals trying to survive and will go where they can best meet their food requirements.

Grizzly bears in the GYA have the highest percent of meat consumption in their diet of any inland grizzly bear population (Hilderbrand et al. 1999). Approximately 30 to 70 percent of the Yellowstone grizzly bear diet is some form of meat. Adult males eat the greatest proportion of meat. Meat is considered to be any form of animal including ungulates (i.e. deer, elk, moose, bison), fish, army cutworm moths, other insects, and small mammals (i.e., ground squirrels, mice, voles).

Specific to the Greater Yellowstone Area, four seasonal foods have been identified as being important to the grizzly bear population. Ungulates (primarily elk and bison, but also deer and moose) are especially important during spring after emergence from dens and through the calving/fawning seasons (Cole 1972, Gunther and Renkin 1990, Mattson et al. 1991, Mattson and Knight 1992, Green et al. 1997, Mattson 1997). Recent research has demonstrated that grizzly bears seek hunter-killed carcasses and gut-piles (Haroldson et al. 2004). Whitebark pine seeds are the most important fall food of Yellowstone grizzly bears, and the availability of nuts influences annual feeding strategies and movement patterns (Kendall 1983, Blanchard 1990, Mattson et al. 1992a and 1992b, Mattson and Reinhart 1997, Mattson 1997). Army cutworm moths are a preferred source of nutrition for many grizzly bears in the Yellowstone ecosystem and represent a

high quality food that is available during the summer (Mattson et al. 1991, French et al. 1994, Ternent et al. 2001). Grizzly bears feed on spawning cutthroat trout along the tributaries of Yellowstone Lake during the spawning season from May 1 to July 15 (Mattson and Reinhart 1995).

Army cutworm moth sites were first recognized as an important food source for grizzly bears in the GYE during the mid-1980s. Early observations indicated that moths, and subsequently bears, showed specific site fidelity. These sites are generally high alpine areas dominated by talus and scree adjacent to areas with abundant alpine flowers. Such areas are referred to as “insect aggregation sites”. Since their discovery, numerous bears have been counted on or near these aggregation sites due to excellent sightability from lack of trees and simultaneous use by multiple bears. (Bjornlie 2011).

Only a few insect aggregation sites have been investigated by ground reconnaissance and the boundaries of sites are not clearly known. In addition, it is likely that the size and location of insect aggregation sites fluctuate from year to year with moth abundance and variance in environmental factors such as snow cover (Bjornlie 2011).

Since 1986, insect aggregation sites have been monitored during aerial observations in the Greater Yellowstone Ecosystem. Knowledge of these sites has increased as in 1986 there were 4 confirmed moths sites in the Greater Yellowstone Ecosystem and in 2010 there were 38 (Bjornlie 2011).

Denning Chronology and Habitat

Grizzly bears in the Greater Yellowstone Area can den from the end of September to the last week in April or early May, with entrance and emergence dates being affected by the gender and reproductive status of the bears (Judd et al. 1986, Haroldson et al. 2002). Denning periods differed among classes and averaged 171 days for females that emerged from dens with cubs, 151 days for other females, and 131 days for males. Known pregnant females tended to den at higher elevations and, following emergence, remained at higher elevations until late May. Females with cubs remained relatively close (less than 3 kilometers) to den sites until the last two weeks in May.

Denning habitat has been described as follows (Judd et al. 1986, Haroldson et al. 2002):

- Den sites are associated with moderate tree cover (26 to 75 percent canopy cover).
- Den sites are usually on 30- to 60-degree slopes.
- Den sites occurred on all aspects, although northerly exposures were most common.
- Grizzly bears usually dig new dens, but occasionally used natural cavities or a den from a previous year.
- Mean elevation at den sites for females with cubs that emerged from dens was 8,845 feet. Mean elevation for other females was 8,467 feet, and for males was 8,444 feet.

Grizzly Bear/Human Interactions

A primary factor in providing for the conservation of grizzly bears is the management of grizzly bear/human interactions. A majority of grizzly bear mortality is attributable to grizzly bear/human conflicts with a common outcome of bear removal by interagency bear managers or killing by humans for other reasons. In addition to mortality concerns, providing secure habitat (areas free of motorized access) is important to enable bears to fully use their food sources, denning sites,

and other living needs. Human presence can limit bear use of habitat, create tolerance among some bears that allows for interaction at great risk to the bears, or attract bears to unnatural or unsecured food sources increasing the risk of habituation to unnatural foods and human conflict.

Grizzly Bear Mortalities within the Greater Yellowstone Area (GYA)

From 1973 to 2011, there have been approximately 639 grizzly bear deaths in the Greater Yellowstone Area (Table BA- 5) (Interagency Grizzly Bear Study Team (IGBST) Final Reports from 2000-2011). It's important to note that the 2011 data is preliminary and limited information is available for mortalities still under investigation. Of these 639 deaths, 476 were human-caused grizzly bear deaths (75 percent of the total) and 167 were natural and unknown-cause grizzly bear deaths (26 percent of the total). From 1973 through 1996, grizzly bear deaths occurred outside of the PCA (Recovery Zone) in only five years. Starting in 1997, grizzly bear deaths have occurred each year outside the PCA.

Table BA- 5. All Greater Yellowstone Ecosystem bear mortalities, 1973–2011

All Bears Greater Yellowstone Ecosystem					All Bears Greater Yellowstone Ecosystem				
In ^a		Out ^a		Year	In ^a		Out ^a		Year
1973	14	0	3	0	1992	4	0	4	0
1974	15	0	1	0	1993	3	0	2	0
1975	3	0	0	0	1994	10	1	0	0
1976	6	0	1	0	1995	17	0	0	0
1977	14	0	3	0	1996	10	0	4	1
1978	7	0	0	0	1997	8	2	10	0
1979	7	1	0	0	1998	1	2	3	0
1980	6	0	4	0	1999	7	1	8	0
1981	10	0	3	0	2000*	16	6	14	0
1982	14	0	3	0	2001	17	3	8	1
1983	6	0	1	0	2002	15	2	8	0
1984	8	0	2	0	2003	10	2	5	0
1985	5	1	7	0	2004	17	2	7	0
1986	5	4	2	0	2005	7	4	0	0
1987	3	0	0	0	2006	5	2	5	2
1988	5	0	6	0	2007**	24	7		
1989	2	0	1	0	2008***	37	11		
1990	9	0	0	0	2009	24	7		
1991	0	0	0	0	2010	42	8		
					2011	34	8		

a-Infers to inside the recovery Zone (RZ) or within a 10-mile perimeter of the RZ. Out refers to >10 miles outside RZ.

*Beginning in 2000, probably mortalities were included in the calculation of mortality thresholds and cubs of the year (COY) orphaned as a result of human causes will be designated as probably mortalities. Prior to these changes, COY orphaned after July 1 were designated possible mortalities (Craighead et al. 1988).

**2007 was the first year the updated methods for calculating population levels and allowable mortality limits as a percentage of the population.

***2008 was the first year mortality thresholds were exceeded for males and females. The mortality thresholds for dependent young were not exceeded.

For the last 9 years (2003 to 2011), approximately 88 percent (126 out of 143) of known and probable grizzly bear mortalities on National Forest System lands within the Greater Yellowstone Area have been human-caused. A majority of these mortalities are in the category of hunting-related self-defense (42 percent) and the remaining are a combination of food-habituated bears or bears responsible for property damage (16 percent), livestock-related (9 percent), hunting-related mistaken identity (7 percent), unknown (16 percent), and others (Table BA- 6).

Table BA- 6. Grizzly bear human-caused mortalities on all National Forest System lands within the Greater Yellowstone Area 2003–2010 (IGBST 2003-2011)

Type of Mortality	Percentage	Number
Self Defense Hunting Related	42%	53
Livestock	9%	11
Handling/Accident	2%	3
Mistaken Identity Hunter Related	7%	9
Food Habituated or Property Damage	16%	21
Malicious Killing	3%	4
Human-caused unknown	16%	20
Roadkill	4%	5
Defense of Life	<1%	1
	Total	127

Of these grizzly bear human-caused mortalities on the National Forests in the Greater Yellowstone Area (127), approximately 46 percent (59) have occurred on the SNF. The majority of the human-caused mortalities on the SNF have occurred from hunting related incidents (self-defense and mistaken identity) or management removal for food habituated or property damage conflicts (Table BA- 7).

Table BA- 7. Grizzly bear human-caused mortalities on the Shoshone 2003–2011 (IGBST 2003-2011)

Type of Mortality	Percentage	Number
Self Defense Hunting Related	44%	26
Livestock	6%	4
Handling/Accident	2%	1
Mistaken Identity Hunter Related	10%	6
Food Habituated or Property Damage	14%	8
Malicious Killing	3%	2
Human-caused unknown	15%	9
Roadkill	3%	2
Defense of Life	2%	1
	Total	59

To reduce grizzly bear deaths on National Forest System lands, the Shoshone has closed domestic sheep allotments with recurring conflicts in the PCA, established food storage regulations, provided bear resistant containers for garbage and food storage, provided information and

education materials and programs, established special grizzly bear requirements in contracts and permits, and issued access restrictions and regulations.

Grizzly Bear/Human Conflicts in the Greater Yellowstone Area

Grizzly bear/human conflicts are defined as incidents, in which grizzly bears injure people, damage property, kill or injure livestock, damage beehives, obtain anthropogenic (unnatural) foods, or damage or obtain garden and orchard fruits and vegetables. All conflicts reported to State and Federal agencies are entered into State databases and compiled annually by Yellowstone National Park and reported in the IGBST Annual Report. Grizzly bear/human encounters that did not result in human injury or property damage are also recorded, but categorized as confrontations rather than conflicts.

There were 295 grizzly bear/human conflicts in the Greater Yellowstone Ecosystem in 2010. This was the most conflicts reported since recordkeeping began in 1992. These incidents included bears obtaining anthropogenic foods (38 percent), killing livestock (37 percent) damaging property (13 percent), obtaining vegetable and fruits from gardens and orchards (7 percent) and injuring people (3 percent). Of the 295 reported conflicts, 71 percent occurred outside of the recovery zone or PCA. Over half of the conflicts (58 percent) occurred on private land. The remaining (42 percent) conflicts occurred on public land with 33 percent on National Forest System lands and 2 percent on National Park Service lands. Grizzly bear habitat under different ownership exhibited different types of bear-human conflicts in 2010. On private property, bears damaging property and obtaining anthropogenic foods (garbage, grain, bird seed, dog food, garden vegetables, apples) were most common (74 percent); on National Forest System lands, livestock depredations were most common (68 percent) and on National Park Service lands, 6 total conflicts occurred involving property damage and anthropogenic foods (Gunther et al. 2011).

A conflict distribution map was constructed in 2010 by the IGBST. This map identified 4 areas where most grizzly bear-human conflicts occurred in the Greater Yellowstone Ecosystem over the last 3 years. These 4 areas contained almost half (47 percent) of the conflicts that occurred between 2008 and 2010. The 4 areas are 1) The Green River area (132 conflicts); 2) the North and South Forks of the Shoshone River (74 conflicts); the Gardiner Basin (69 conflicts) and 4) the Clarks Fork area (20 conflicts). The North and South Forks of the Shoshone River and the Clarks Fork area are areas within the SNF (the planning area). The IGBST recommended that these areas receive consideration when allocating funding for grizzly bear conservation (Gunther et al. 2011).

Historically, numbers of grizzly bear-human conflicts and management actions tend to decrease during years with good white bark pine cone production. IGBST research clearly shows that bears tend to eat more meat when whitebark pine seeds are not available and that there is an increase in hunter-grizzly bear conflicts and mortalities in poor seed years. However, extensive areas of beetle killed whitebark pine may reduce cone abundance and availability locally and may dampen or modify this trend (IGBST 2010). According to the 2010 Whitebark Pine Cone Production Report (Interagency Grizzly Bear Study Team 2011), whitebark pine surveys showed poor cone production. The mean cones/tree was 5.25, which is below the average (mean cones/tree is 15). Typically, numbers of grizzly bear-human conflicts and management actions tend to increase during years with poor cone availability (Gunther et al. 2011).

Grizzly Bear/Motorized Access and Secure Habitat Interactions

The management of human use levels through access route management is one of the most powerful tools available to balance the needs of grizzly bears with the needs and activities of

humans. It has been documented in several research projects, completed and ongoing, that unregulated human access and development within grizzly bear habitat can contribute to increased bear mortality and affect bear use of existing habitat (Interagency Grizzly Bear Committee (IGBC) 1998, Interagency Conservation Strategy Team 2007).

Historically, management of motorized use has been primarily accomplished through restriction of certain types of motorized use on established access routes, i.e., management of open motorized route densities. Recent research has shown that secure habitat (areas that are free of motorized traffic, also referred to as core areas) is an important component of grizzly bear habitat (IGBC 1998).

By managing motorized access, the following grizzly bear management objectives can be met (IGBC 1998):

- Minimize human interaction and potential grizzly bear mortality
- Minimize displacement from important habitats
- Minimize habituation to humans
- Provide relatively secure habitat where energy requirements can be met

History has demonstrated that grizzly bear populations survived where frequencies of contact with humans were very low. Populations of grizzly bears persisted in those areas where large expanses of relatively secure habitat were retained and where human-induced mortality was low. In the Yellowstone area, this is primarily associated with national parks, wilderness areas, and large blocks of public lands (Interagency Grizzly Bear Study Team 1998). Habitat security requires minimizing mortality risk and displacement from human activities in a sufficient amount of habitat to allow the population to benefit from this secure habitat and respond with increasing numbers and distribution. Habitat security allows a population to increase in numbers and distribution as lowered mortality results in more reproduction and cub recruitment into the adult population. This results in an increasing population. As the population increases, it begins to expand in range and distribution. Both of these responses to habitat security are currently ongoing in the Yellowstone population as the population is increasing at 3 to 4 percent per year (Boyce et al. 2001) and increasing in distribution (Schwartz et al. 2002).

Secure habitat must also provide the basic seasonal habitat requirements for grizzly bears and should be representative of seasonal habitats available to bears in the entire analysis area (IGBC 1998). The Cumulative Effects Model was used to evaluate the relative habitat value of the existing secure habitat inside the PCA (Interagency Conservation Strategy Team 2007).

Grizzly Bear/Developed Site Interactions

The effects of human activity associated with developments on grizzly bear habitat use have been reported by Mattson et al. 1987, and include the following:

- Grizzly bear use was lower in areas near human developments
- Foraging behavior was disrupted
- Dominant bears tended to displace subordinate bears into areas with more human development
- Adult females and subadult males residing closer to developments were more likely to be involved in management actions (such as being trapped and relocated)

The Shoshone National Forest has instituted a food storage order (04-00-104) in 2004 on all National Forest System lands except for the Washakie Ranger District. This food storage order was implemented to reduce grizzly bear/human conflicts associated with developed sites as well as dispersed sites. Mattson and Knight (1991) analyzed grizzly bear mortality data by three 8-year periods (1962 to 1969, 1975 to 1982, and 1983 to 1990) and by association with different levels of human access, including major developments, primary roads, secondary roads, and backcountry areas. They reported that unit area mortality rates associated with all levels of access decreased over the three time periods. Renkin and Gunther (1996) evaluated bear mortalities in relation to developed sites over a 10-year period (1987 to 1996) and found that bear mortalities in relation to developed areas declined during that period. Even though grizzly bear/human conflicts still occur throughout the Greater Yellowstone Ecosystem (and the project area), these studies show that efforts to reduce those conflicts have been successful.

Grizzly Bear/Livestock Interactions

Knight and Judd (1983) reported the following information about bears that kill livestock:

- All instrumented (radio-collared) grizzly bears known to have had the opportunity (bears that came in close contact with sheep), killed sheep.
- Most grizzly bears that encountered cattle did not make kills.
- All known cattle killers were adult bears, while sheep killers included both adults and subadults.
- They concluded that sheep grazing in occupied grizzly range is a serious problem, since bears kill sheep more readily and because the sheep are closely tended by herders that are protective of their flocks.

Anderson et al. (1997) reported the following information from a study on grizzly bear/cattle interactions on two cattle allotments in northwest Wyoming:

- From a minimum of 24 grizzly bears that were known to use two cattle allotments during a 3-year period, seven bears (possibly eight) preyed on cattle.
- Thirty percent of 194 cattle mortalities documented during the three years were the result of bear predation, 65 percent were not bear-related, and 5 percent were classified as unknown.
- Predatory grizzly bears selected calves (51 of 58, or 88 percent) over adult and yearling cattle.
- All sex/age groups of grizzly bears, except subadult male, were associated with cattle depredations. However, three adult males were responsible for 84 percent of the documented losses where individual depredators could be identified.
- Cattle depredations were limited to a relatively short period (three to eight weeks) during two of the three grazing seasons, and five of the eight bears suspected of killing cattle did not appear to kill more than one calf each.
- Translocating grizzly bears appears to be a viable option for reducing losses, since homing bears may not return before that depredation period ends. Additionally, translocation could prevent the occasional depredator, which appears to be common among grizzlies, from being unnecessarily removed from the population.
- Removing cattle carcasses from allotments also appeared to reduce bear densities, but it could not be determined whether this would reduce depredations.

- Since adult males are responsible for the majority of cattle depredations, selective removal may also be a possible management option, particularly when habitual adult males are involved and translocation, aversion tactics, or carcass removal efforts are ineffective.

In summary, most, if not all, grizzly bears that come in contact with domestic sheep prey on sheep and conflicts are inevitable. Within the planning area from 2003 to 2010, none of the three remaining sheep allotments have had documented grizzly bear conflicts, however, the allotments are not considered occupied by grizzly bears. Not all grizzly bears that come in contact with cattle make kills. However, within the planning area, 21 of the 58 cattle allotments (34 percent) have had documented grizzly bear conflicts (2003-2010) (Table BA- 11).

Conflicts between livestock and grizzly bears in the Greater Yellowstone Area have resulted in the relocation, removal, or direct mortality of grizzly bears. There were 108 documented grizzly bear/livestock conflicts in the Greater Yellowstone Area in 2010. This was approximately 37 percent (108 out of 295) of the total grizzly bear-human conflicts. Of these grizzly/livestock conflicts; 32 percent occurred on the Bridger-Teton National Forest, 32 percent occurred on private property, 20 percent (22 of 108) occurred on the Shoshone National Forest and 7 percent occurred on the Caribou-Targhee National Forest. Approximately 9 percent of the documented grizzly bear mortalities on National Forest System lands since 2003 have been livestock related (Table BA- 6). On the Shoshone, 6 percent (4) of the grizzly bear mortalities have been livestock related (Table BA- 7).

Gray wolf

Status of the Gray Wolf in the Greater Yellowstone Ecosystem

In 1974, the USFWS listed two subspecies of gray wolf as endangered: The Northern Rocky Mountain (NRM) gray wolf (*C. l. irremotus*) and the eastern timber wolf (*C. l. lycaon*) in the Great Lakes region (39 FR 1171). On November 22, 1994, the USFWS designated portions of Idaho, Montana, and Wyoming as two nonessential experimental population areas for the gray wolf under section 10(j) of the Endangered Species Act, including the Yellowstone Experimental Population Area (59 FR 60252). In 2005 and 2008, the USFWS revised these regulations to provide increased management flexibility for this recovered wolf population in states with USFWS-approved post-delisting wolf management plans [70 FR 1286; 73 FR 4720; 50 CFR 17.84(n)].

The NRM wolf population achieved its numerical and distributional recovery goals at the end of 2000 and the temporal portion of the recovery goal was achieved in 2002, when the numerical and distributional recovery goals were exceeded for the third successive year. To meet Endangered Species Act requirements, Idaho, Montana, and Wyoming needed to develop post-delisting wolf management plans to ensure that adequate regulatory mechanisms would exist should Endangered Species Act protections be removed. In 2004 and in 2009, the USFWS determined that Wyoming's wolf management plan was inadequate to conserve Wyoming's share of a recovered NRM gray wolf population. In August of 2011, the Wyoming Governor and Interior Secretary reached an agreement to move forward with delisting. In September 2011, the Wyoming Game and Fish Commission approved changes to its Gray Wolf Management Plan and in October, the USFWS published a notice to delist wolves in Wyoming. The Wyoming Legislature in 2012 made changes to State statutes, which allow Wyoming to move forward with its management plan. Until the USFWS approves Wyoming's plan, wolf management in all of Wyoming (except the Wind River Tribal Lands because the tribe had a USFWS-approved plan)

will remain under the less flexible provisions of the 1994 experimental population rules. However, because of the dynamic listing history of the NRM wolf population, the gray wolf will be included in the consultation process for this project to avoid future confusion on the proper level of analysis if the species is re-listed or reclassified under the Endangered Species Act in the near future.

Habitat Requirements, Home Range, Food Habits

The following information is from: Endangered and Threatened Wildlife and Plants; Final Rule To Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and To Revise the List of Endangered and Threatened Wildlife (USDI Fish and Wildlife Service, 2009a).

Gray wolves (*C. lupus*) are the largest wild members of the dog family. In the NRM, adult male gray wolves average over 45 kilograms (100 pounds), but may weigh up to 60 kilograms (130 pounds). Females weigh slightly less than males. Wolves primarily prey on medium and large mammals and normally live in packs of 2 to 12 animals. In the NRM, pack sizes average about 10 wolves in protected areas, but a few complex packs have been substantially bigger in some areas of Yellowstone National Park (Smith et al. 2006, p. 243; Service et al. 2008, Tables 1–3). Packs typically occupy large distinct territories from 518 to 1,295 square kilometers (km²) (200 to 500 square miles (mi²)) and defend these areas from other wolves or packs. Once a given area is occupied by resident wolf packs, it becomes saturated and wolf numbers become regulated by the amount of available prey, intra-species conflict, other forms of mortality, and dispersal. Dispersing wolves may cover large areas as they try to join other packs or attempt to form their own pack in unoccupied habitat (Mech and Boitani 2003, pp. 11–17).

Typically, only the top-ranking (“alpha”) male and female in each pack breed and produce pups (Packard 2003, p. 38; Smith et al. 2006, pp. 243–4; Service et al. 2008, Tables 1–3). Females and males typically begin breeding as 2-year olds and may annually produce young until they are over 10 years old. Litters are typically born in April and range from 1 to 11 pups, but average around 5 pups (Service et al. 1989–2007, Tables 1–3). Most years, four of these five pups survive until winter (Service et al. 1989–2008, Tables 1–3). Wolves can live 13 years (Holyan et al. 2005, p. 446), but the average lifespan in the NRM is less than 4 years (Smith et al. 2006, p. 245). Pup production and survival can increase when wolf density is lower and food availability per wolf increases (Fuller et al. 2003, p. 186). Pack social structure is very adaptable and resilient. Breeding members can be quickly replaced either from within or outside the pack and pups can be reared by another pack member should their parents die (Packard 2003, p. 38; Brainerd et al. 2008; Mech 2006, p. 1482). Consequently, wolf populations can rapidly recover from severe disruptions, such as very high levels of human-caused mortality or disease. After severe declines, wolf populations can more than double in just 2 years if mortality is reduced; increases of nearly 100 percent per year have been documented in low-density suitable habitat (Fuller et al. 2003, pp. 181–183; Service et al. 2008, Table 4).

Population Status of NRM DPS in Wyoming

The following information (and references therein) are from the 2011 Wyoming Wolf Recovery Annual Report (Jimenez et. al 2012).

The USFWS combines three census techniques to estimate the total number of wolves in Wyoming: (1) Direct observations of wolves; (2) Winter track counts of wolves traveling in snow; and (3) Confirmed reports of wolf sightings from other agencies. A pack is defined as more than two wolves traveling together using a defined home range. A breeding pair is defined as 1 or more

adult males and 1 or more adult females in a pack producing 2 or more pups that survived through 31 December of that year.

In 2011, 328 or more wolves in 48 or more packs (27 or more breeding pairs) inhabited Wyoming, including Yellowstone National Park (Figure BA- 2). Even though the wolf population decreased statewide by approximately 5 percent, 2011 became the tenth consecutive year that the wolf population in Wyoming has exceeded the numerical, distributional, and temporal recovery goals established by the USFWS.

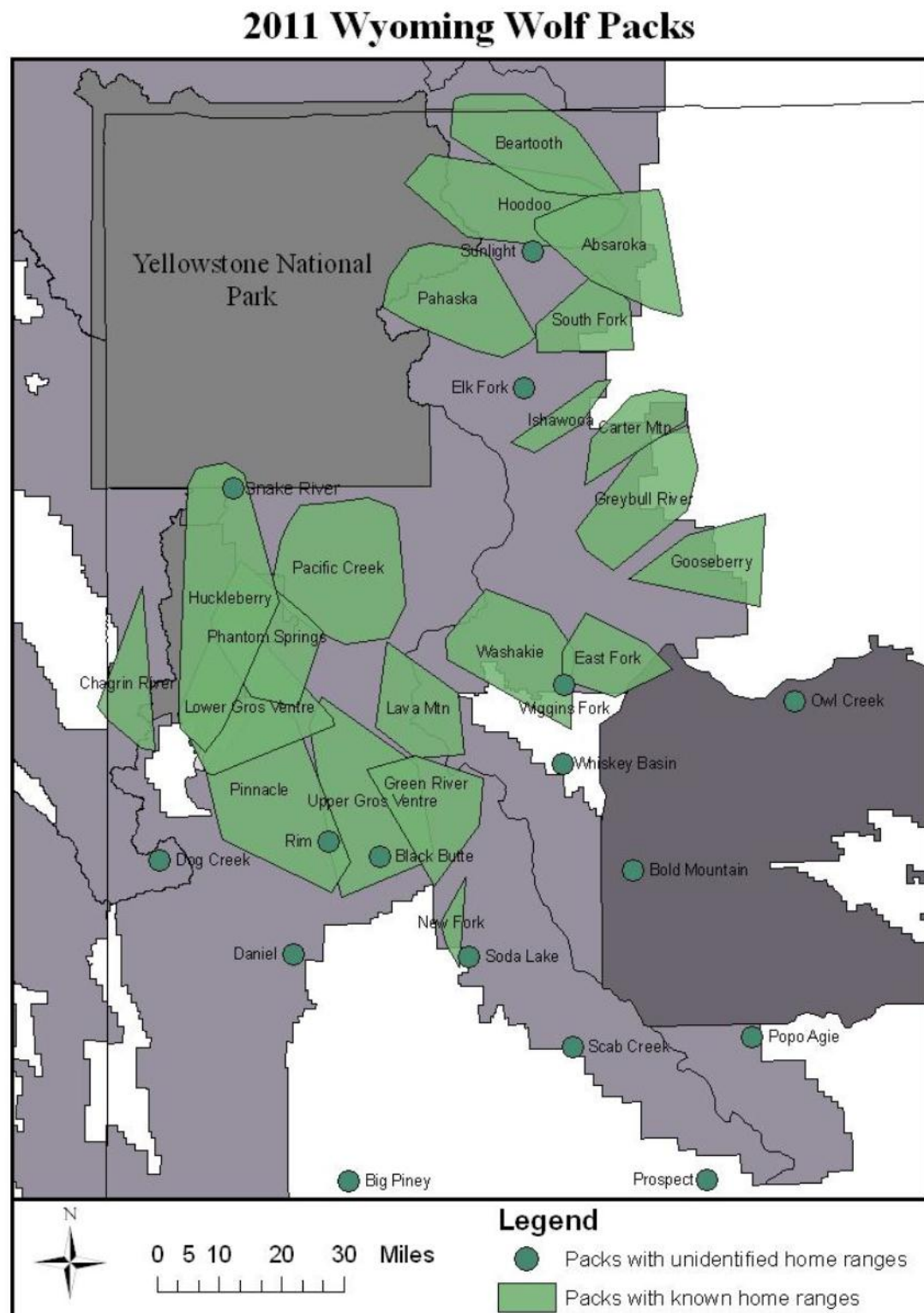


Figure BA- 2. Wyoming wolf pack home ranges 2011 (Jimenez et al. 2012)

The wolf population in Wyoming (outside Yellowstone National Park) had a slight decline from 2010 (246), consisting of 230 or more wolves in 38 or more packs of which 19 or more breeding pairs produced 69 or more pups that survived through 31 December 2010. From 2002 through 2011, the wolf population has grown each year, with the exceptions in 2008 and 2011. Average pack size in 2011 was 6.1 wolves per pack and average litter size was 4.1 pups per litter.

Wolf numbers in Yellowstone National Park were basically the same as 2010 (97) with 98 wolves living in 10 packs of which 8 breeding pairs produced 34 pups that survived through the end of the year. Average pack size in Yellowstone National Park was 10.2 wolves per pack. Intraspecific strife, food stress, and mange are all likely reasons for fewer wolves in Yellowstone National Park.

There were 51 wolf mortalities recorded in Wyoming (outside Yellowstone National Park) in 2011. Causes of mortality included: agency control = 36; under investigation and unknown = 6; human = 6, and natural = 3. Yellowstone National Park recorded 10 dead radio-collared wolves. Causes of mortality include intraspecific competition = 6; interspecific = 1 (killed by bison or elk); vehicle strike = 1, legal harvest (outside of Yellowstone) = 1 and illegal harvest = 1.

Wolf/Livestock Interactions

In 2011, wolves killed over 65 livestock (35 cattle and 30 sheep) (Table BA- 8), 1 dog, and 1 horse. Agency control efforts removed 36 depredating wolves (approximately 16 percent of the Wyoming wolf population outside Yellowstone National Park) to reduce livestock losses due to wolves. Confirmed livestock depredations included 35 cattle (28 calves; 7 cows/yearlings) and 30 sheep. The number of cattle depredations in Wyoming decreased in 2007, 2008, and 2009, and increased in 2010 and 2011; however, the number of sheep killed by wolves increased in 2008 and 2009 and decreased in 2010 and 2011.

Table BA- 8. Wolf depredations in Wyoming: 2000—2011 (Jimenez et al. 2012)

Depredations	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Cattle	3	18	23	34	75	54	123	55	41	20	26	35
Sheep	25	34	0	7	18	27	38	16	26	195	33	30
Dogs	6	2	0	0	2	1	1	2	0	7	0	1
Goats	0	0	0	0	10	0	0	0	0	0	0	0
Horses	0	0	0	2	0	1	0	1	0	0	1	1
Wolves Controlled	1	2	4	6	18	29	41	44	63	31	40	36

Canada lynx

Status of Canada Lynx and Canada Lynx Critical Habitat

Listing Status of the Contiguous U.S. Distinct Population Segment (DPS)

The following history (and reference within) is from USDI Fish and Wildlife Service 2003. In 1977, the Canada lynx (*lynx*) was added to Appendix II of the Convention on International Trade in Endangered Species (CITES) of Wild Flora and Fauna. The species was classified as a category 2 candidate species in the December 30, 1982, Vertebrate Notice of Review (47 FR 58454); meaning that more information was necessary to determine whether the species' status was declining. The USFWS published a notice of a 90-day petition finding on October 6, 1992,

that listing the North Cascades population of the lynx as endangered may be warranted (57 FR 46007). On July 9, 1993, the USFWS published a notice indicating that they did not have substantial information to indicate that listing the population may be warranted (58 FR 36924).

The USFWS began a status review throughout the lower 48 states to determine if the species was threatened or endangered, and on December 27, 1994, the USFWS published a notice (59 FR 66507) of the 12-month finding that listing the lynx in the contiguous United States was not warranted because of the lack of residency in lynx populations in the lower 48 States and their inability to substantiate threats to the population. On March 27, 1997, the court remanded this decision and on May 27, 1997, the USFWS published a 12-month finding (62 FR 28653) that the lynx population in the contiguous United States was warranted for listing under the Endangered Species Act, but precluded by higher priority listing actions. This warranted-but- precluded finding automatically elevated the lynx to candidate species status. A proposed rule to list the contiguous United States distinct population segment of the Canada lynx as threatened was published on July 8, 1998 (63 FR 36994) and on March 24, 2000, the USFWS determined threatened status for the contiguous United States distinct population segment of the Canada lynx (*Lynx canadensis*) (65 FR 16052). This population segment ruling was updated in 2003 (68 CFR 40072) and the DPS includes the states of Colorado, Idaho, Maine, Michigan, Minnesota, Montana, New Hampshire, New York, Oregon, Utah, Vermont, Washington, Wisconsin, and Wyoming.

Canada Lynx Critical Habitat

The proposed rule to designate critical habitat for the lynx was published in the Federal Register on November 9, 2005 (70 FR 68294) and on November 9, 2006, the USFWS published the final rule designating critical habitat for the contiguous United States distinct population segment of the Canada lynx (71 FR 66007). In total, approximately 1,841 square miles fell within the boundaries of the critical habitat designation, in Minnesota, Montana, and Washington. On July 20, 2007, the USFWS announced that they would review the November 9, 2006, final critical habitat rule after questions were raised about the integrity of scientific information used and determined that the critical habitat designation was improperly influenced by then-Deputy Assistant Secretary of the Interior Julie MacDonald. On February 25, 2009 (USDI Fish and Wildlife Service 2009b), the USFWS designated revised critical habitat for the contiguous United States distinct population segment of the Canada lynx under the Endangered Species Act of 1973, as amended (74 FR 8616). In total, approximately 39,000 square miles fell within Maine, Minnesota, Montana, Wyoming, Idaho, and Washington. In Unit #5 (Figure BA- 3), the Greater Yellowstone Area (Yellowstone National Park and surrounding lands in southwestern Montana and northwestern Wyoming): approximately 9,500 square miles of critical habitat was designated in portions of Gallatin, Park, Sweetgrass, Stillwater, and Carbon Counties in Montana; and Park, Teton, Fremont, Sublette, and Lincoln Counties in Wyoming.

In the revised critical habitat designation, the USFWS outlined the physical and biological features that are essential to conserving the Canada lynx and that may require special management considerations and protection. They considered the physical and biological features to be the primary constituent elements (PCEs) laid out in the appropriate quantity and spatial arrangement for the conservation of the species. The primary constituent element for lynx critical habitat is:

- 1) Boreal forest landscapes supporting a mosaic of differing successional forest stages and containing : a) a presence of snowshoe hares and their preferred habitat conditions, which include dense understories of young trees, shrubs or overhanging boughs that protrude above the snow,

and mature multistored stands with conifer boughs touching the snow surface; b) winter snow conditions that are generally deep and fluffy for extended periods of time; c) sites for denning that have abundant coarse woody debris, such as downed trees and root wads; and d) matrix habitat (e.g., hardwood forest, dry forest, non-forest, or other habitat types that do not support snowshoe hares) that occurs between patches of boreal forest in close juxtaposition (at the scale of a lynx home range) such that lynx are likely to travel through such habitat while accessing patches of boreal forest within a home range (Federal Register /Vol. 74, No. 36, pp 8638).

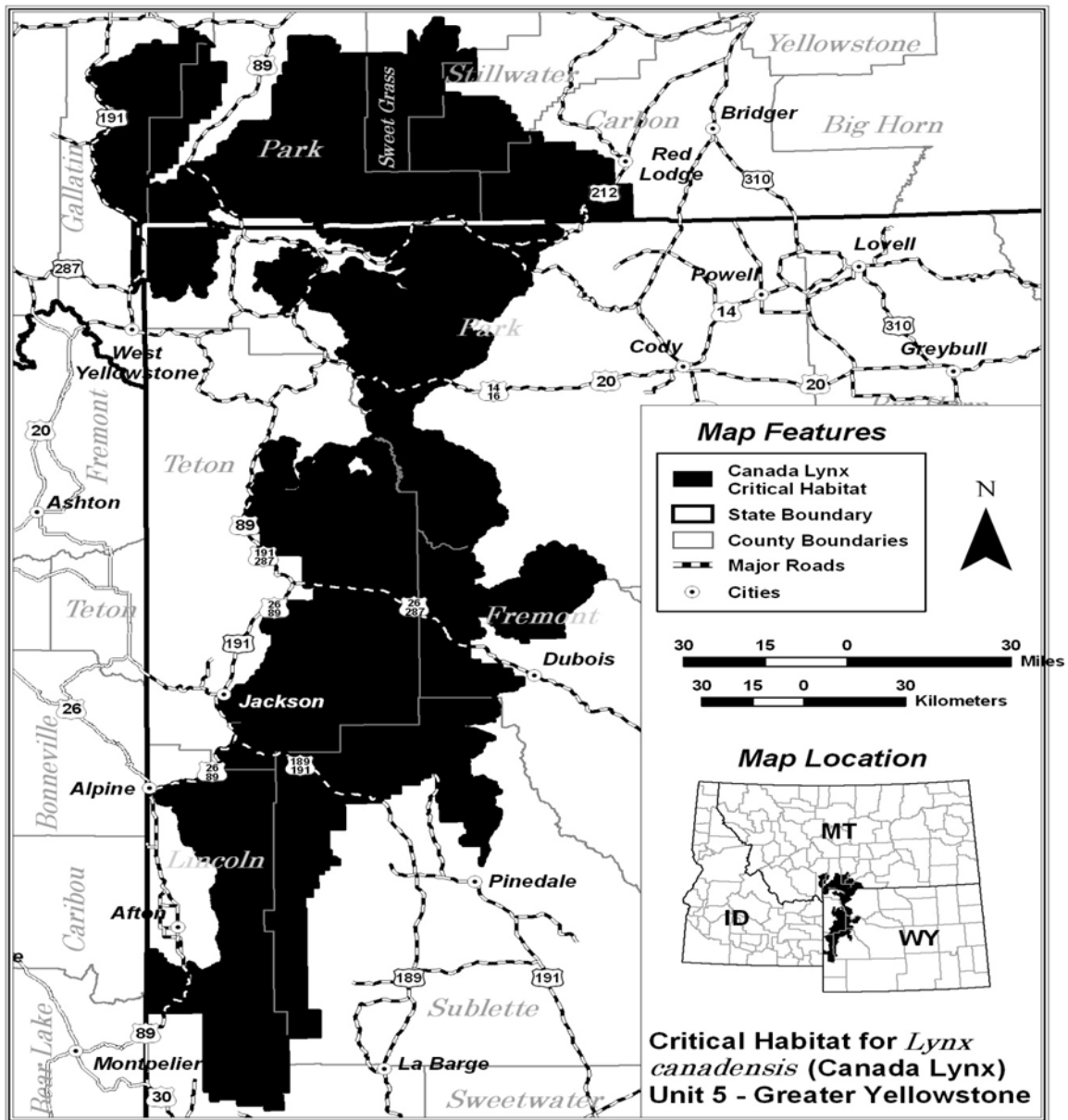


Figure BA- 3. Canada lynx critical habitat – Unit #5-Greater Yellowstone Area

Habitat Requirements, Home Range, Food Habits

Canada lynx are solitary carnivores, generally occurring at low densities in boreal forest habitats. In most of their range, Canada lynx densities and population dynamics are strongly tied to the distribution and abundance of snowshoe hare (*lepus americanus*), their primary prey.

Foraging habitat for lynx is typically described in terms of suitability for their primary prey—snowshoe hares. Hares use young conifer stands that are densely stocked with seedlings or saplings, tall enough to provide browse for snowshoe hares above typical winter snow depth (Koehler and Brittel 1990). Buskirk et al. (1999) suggested that snowshoe hare abundance should be high in sapling and old, “gap phase” forests, where tree mortality and snag loss create gaps in the mature forest canopy allowing increased understory production.

Denning habitat is defined by the presence of ground-level structures that provide security and cover for kittens. Suitable structures are most often found in old and mature forests with substantial amounts of coarse woody debris. The common components of natal den sites appear to be high horizontal cover in the form of downed logs, root wads, and high sapling density (Koehler 1990, Mowat et al. 2000, Squires and Laurion 2000). In Wyoming, two dens were located in 1998 on moderately steep slopes (36 percent) in mature subalpine fir forest with co-dominant lodgepole pine (Squires and Laurion 2000). The natal den was located in a cave-like tree well with downed logs over the opening. The maternal den was located about 200 meters from the natal den in a depression beside a fallen tree. Although not rigorously quantified, the habitat characteristics around four additional dens found in 1999 were all associated with coarse woody debris (ibid).

Lynx may avoid recent clearcuts that are more than 100 meters wide because they lack sufficient cover (Koehler 1990). Such areas may also not be recolonized by prey species (mainly snowshoe hares) until as much as 20 to 25 years after harvest (Koehler and Brittel 1990). On a landscape scale, Canada lynx habitat includes a mosaic of early seral stands that support snowshoe hare populations and late seral stands of dense old-growth forest that provide ideal denning and security habitat.

8.0 Environmental baseline for the species evaluated

The environmental baseline for this biological assessment includes the existing grizzly bear habitat conditions and conflict situation within the planning area, relationship to the threats to the species and grizzly bear management direction in the existing land and resource management plan for the Shoshone National Forest and best available science. With the relisting of the grizzly bear, updates to the 1993 Recovery Plan and the Conservation Strategy are determined the ‘best available science’ in regard to grizzly bear management.

The environmental baseline also includes the existing gray wolf, Canada lynx and Canada lynx Critical Habitat within the planning area, relationship to existing threats to these species and the management direction in the Shoshone Forest Plan and the Northern Rockies Lynx Management Direction (USDA Forest Service 2007).

Status of the Grizzly Bear on the Shoshone National Forest (Action Area)

At minimum, grizzly bears need food, seasonal foraging habitat, denning habitat and security in an area of sufficient size for survival. The precise mixture of these diverse elements however, is impossible to specify. The difficulty lies in the fact that grizzly bears are long-lived opportunistic

omnivores whose needs for foods and space vary depending on a multitude of environmental and behavioral factors and on variation in the experience and knowledge of each individual bear. According to the Conservation Strategy (Interagency Conservation Strategy Team 2007), the key to establishing habitat criteria that will maintain a healthy population is to look at the habitat factors in the past that produced a grizzly bear population in the Yellowstone area that is increasing in numbers and expanding in range. These habitat factors were used to establish the habitat criteria for the future that must be maintained if a healthy population continues to be preserved and are detailed in the Conservation Strategy. Since there is no quantitative way to estimate precisely the number of animals required for a viable population of any species, the best way to ensure a healthy population of grizzly bears is to monitor both population and habitat parameters closely and respond when necessary with adaptive management addressing the problems of the population in a dynamic way (Interagency Conservation Strategy Team 2007). The Conservation Strategy is designed to accomplish this and all the Forests in the Greater Yellowstone Area are signed partners.

The Yellowstone grizzly bear population was removed from the threatened species list in April 2007, after the population exceeded recovery goals for several years. Grizzlies became relisted as a federally threatened species in September 2009, after a successful legal challenge to the delisting process. Grizzlies are still expanding in number and distribution throughout the ecosystem including the Shoshone. The Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area was released in 2003 in preparation for delisting, and finalized in 2007. Although it is not Forest Service policy at this time, it does represent best available science for grizzly bear conservation, and therefore, is considered to be the standard used for grizzly bear management. The state and federal implementation plans within the Strategy provides a framework for managing the Primary Conservation Area (PCA, synonymously, the Recovery Zone) and adjacent areas of suitable grizzly bear habitat. The PCA is the area considered the adequate seasonal habitat needed to support the recovered Yellowstone grizzly bear population for the foreseeable future and allow bears to continue to expand outside the PCA (Figure BA- 1). A recovered grizzly bear population is one having high probability of existence into the foreseeable future (greater than 100 years) and for which the five factors in Section 4(a)(1) of the Endangered Species Act have been successfully addressed. The PCA was designed specifically with these five factors in mind.

A major change to the 1993 Demographic Recovery Criterion 3 in the Grizzly Bear Recovery Plan was updated with the 2007 Demographic Recovery Criteria because the 1993 version was no longer considered the best technique to assess recovery of the Yellowstone grizzly bear populations. The end result was revised methods for calculating population size, estimating the known to unknown mortality ratio and estimating sustainable mortality levels for the Yellowstone grizzly population based on best available science (Interagency Conservation Strategy Team 2007). The allowable mortality limits for each bear class are calculated annually based on total population estimates of each bear class for the current year. The Interagency Grizzly Bear Study Team (IGBST) calculates both the total population size and the mortality limits within an area designated by the Conservation Strategy that overlaps and extends beyond suitable habitat (the project area is within the Conservation Strategy area).

For independent females, a 9 percent limit was considered sustainable because simulations have shown that this level of adult female mortality rate allows a stable to increasing population 95 percent of the time (Harris et al. 2006). For independent males, a 15 percent limit was considered sustainable because it approximates the level of male mortality in the Greater Yellowstone Area from 1983 to 2001, a period when the mean growth rate of the population was estimated at 4 to 7

percent per year. The IGBST will reevaluate mortality limits every 8 to 10 years or as new scientific information becomes available or at the request of the Coordinating Committee.

Forest Plan Direction for Grizzly Bear Habitat Management

The 1986 Shoshone National Forest Land and Resource Management Plan includes a goal to “maintain or improve habitat for threatened and endangered species including participation in recovery efforts for listed species.”

An amendment to the Forest Plan in 1991 established the primacy of the Grizzly Bear Guidelines over all other Plan direction. This amendment incorporated the guidelines, in total, by reference. In addition, the Forest Plan provides specific direction for minimizing impacts to grizzly bears from timber harvest, wilderness, oil and gas leasing, and motorized access activities.

The grizzly bear is a management indicator species and served as the basis for formulating habitat diversity standards in the Forest Plan. Monitoring is required for known human-caused grizzly bear mortalities, compliance with the 1986 Guidelines, and grizzly bear habitat effectiveness.

Grizzly Bear Habitat/Distribution on the Shoshone NF

Approximately 58.5 percent (5,383 square miles) of the PCA is National Forest System land, consisting of six national forests. The Shoshone has approximately 1,233,000 acres or 36 percent of the PCA that occurs on National Forest System lands (Figure BA- 4).

The grizzly bear is a management indicator species (recovery species) identified in the 1986 Forest Plan. Grizzly bear/human conflict minimization is a high priority management consideration throughout the Forest within all areas occupied by grizzlies (Figure BA- 5). As stated above, based on population monitoring, sightings of females with young have increased within the Greater Yellowstone Ecosystem as well as on the Forest in recent years. Grizzly bears have also increased from relatively uncommon to common in most northern areas of the Shoshone in the past two decades, in conjunction with a steady trend of increasing bear density east and south of Yellowstone National Park. Grizzly bears now frequent most parts of the Clarks Fork, Greybull, and Wapiti Ranger Districts, and areas of the Wind River Ranger District north of Dubois. Sightings south of Dubois are increasing.

The grizzly bear is known to occur on all five ranger districts on the Shoshone. In 2011, a single male grizzly bear was trapped west of Lander, Wyoming, and relocated to the Bridger-Teton National Forest. This bear most likely used habitat on the southern end of the Shoshone (Washakie Ranger District). Sightings and radio locations of grizzlies have increased outside the PCA area and numbers of bears have been increasing. Grizzly use is occurring at various levels on roughly 2 million acres on the Forest. Documented use has occurred in many areas east and south of the PCA both on and off-Forest. Grizzlies have been documented south of Union Pass on the Bridger-Teton/Shoshone National Forest boundary. The most extensive use by grizzlies outside the PCA occurs in habitats south of the PCA near Dubois, and southeast of the PCA near Meeteetse.

Very little is known about the insect aggregation sites on the Shoshone. Some sites are known more to the public than others by word of mouth and because of their sightability and access from nearby roads. Other sites are miles into the back country where the occasional hiker or horseman might stumble on the site during its use.

However, one study in the Absaroka Mountains on the north half of the Shoshone, summarized site information for 18 suspected and confirmed moth sites from data collected during aerial observations from 1981 to 1989. Six of the sites were then visited from 1987 to 1989. All 18 sites were located in glacial cirques on scree slopes immediately below steeper headwalls or cliffs. Elevations at the 18 sites ranged from 3,024 to 3,680 meters (9,072 to 11,040 feet) and slopes were 13 to 60 degrees. Sites were located on all aspects with a majority of the sites being on north, west, and south aspects. Scree slopes used for feeding by bears were essentially devoid of vegetation; even lichen cover on rocks was sparse (Mattson et al. 1991b).

The study goes on to suggest that insect aggregation sites on the Shoshone are important to grizzly bears. Army cutworm moths are predictably a high quality food; during July and August coinciding with the onset of spring hyperphagia (probably during late July) when grizzly bears accumulate the body fat necessary for surviving winter hibernation (Mattson et al. 1991b).

In 2001, a preliminary survey was undertaken in the Wind River Range on the Shoshone to identify any moth sites in the southern part of the Forest. Of the 19 sites surveyed, 14 contained moths (Ratner 2001). This survey was expanded in 2003, and included 20 sites surveyed. Of these sites, 17 had moths with 15 of the 17 having “very high” to “high” densities (Ratner 2003). While none of these sites had documented grizzly bear use, the potential exists as the bear population expands to the south.

The number of confirmed moth sites on the Shoshone is unknown at this time.

The 1986 Forest Plan and its amendments do not contain any direction for the management of insect aggregation sites on the Shoshone.

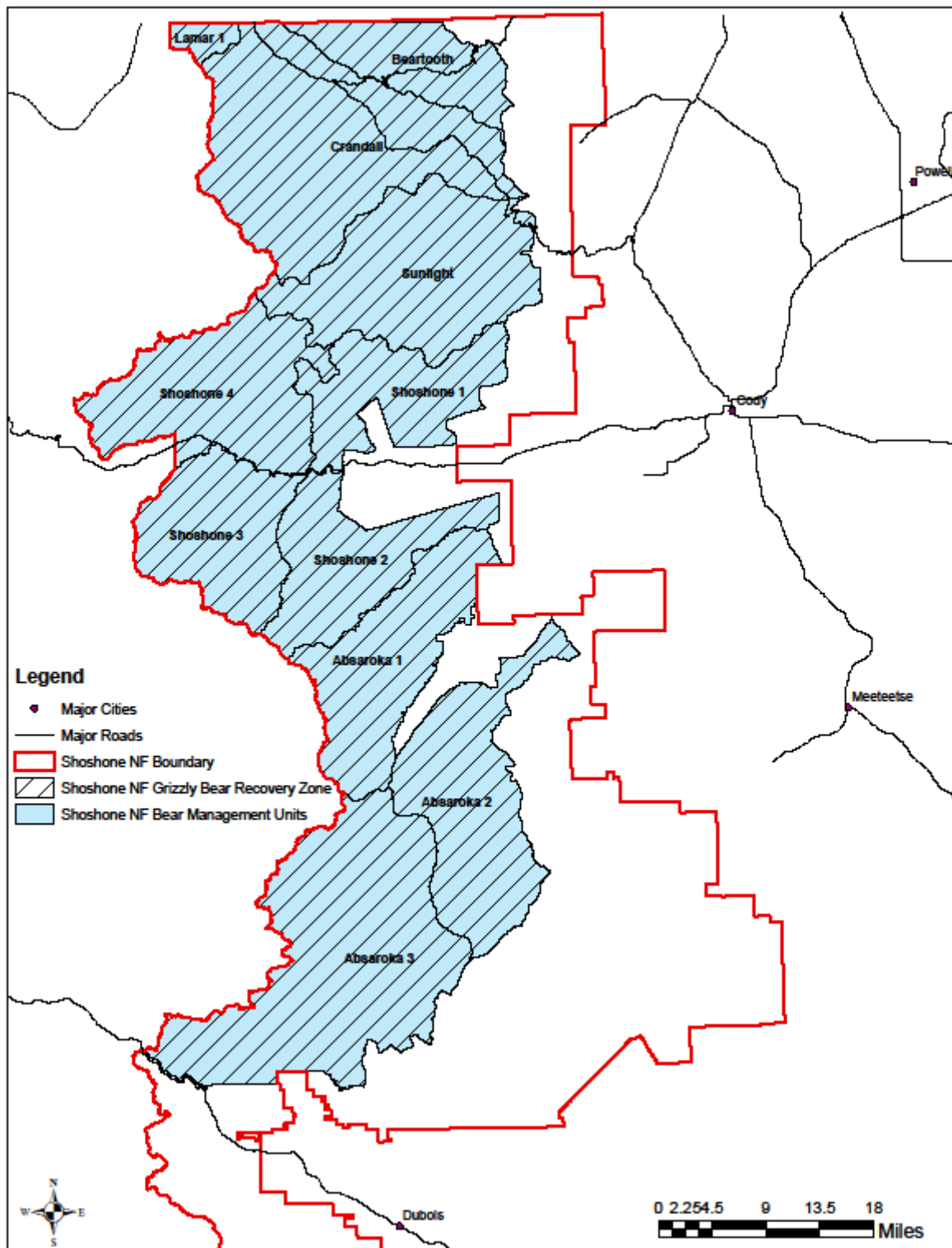


Figure BA- 4. Grizzly bear primary conservation area (recovery zone) and bear management units, Shoshone National Forest

Grizzly bear occurrence is variable across the commercial livestock grazing allotments on the Shoshone. Grizzly bear densities are generally high in the area from the Montana border to areas north of Dubois, with densities being lower east of the Greybull River drainage. Bear use continues to expand immediately south of Dubois. The following categories summarize grizzly bear occurrence and grizzly bear/livestock conflict potential within livestock grazing allotments on the Shoshone:

Grazing allotments within or having a portion in the primary conservation area (PCA).

Eighteen allotments are within (in whole or part of) the PCA boundary (Figure BA- 5). Grizzly bear occurrence and use in and adjacent to these allotments is common. Depredation, other conflicts, and control actions have occurred in these areas. These allotments have the highest potential for grizzly bear/livestock conflicts.

Grazing allotments occupied by grizzly bears outside of the PCA. Twenty-nine allotments are occupied by grizzly bears outside of the PCA boundary. Grizzly use in these allotments is variable, but is anticipated to increase as most are in historical habitat. Depredation, other conflicts, and control actions have occurred in these areas. These allotments have a high to moderate potential for grizzly bear/livestock conflicts.

Grazing allotments outside of the PCA and not occupied by grizzly bears. Thirteen allotments are unoccupied by grizzly bears. Grizzly bear occurrence on these 13 allotments in the Wind River Mountains near Lander is limited to an occasional sighting. Suitable grizzly bear habitat likely exists throughout these allotments as evidenced by the common presence of black bears and historical records. These areas are likely to be occupied by grizzly in the future due to natural expansion; the potential for future cattle depredation exists.

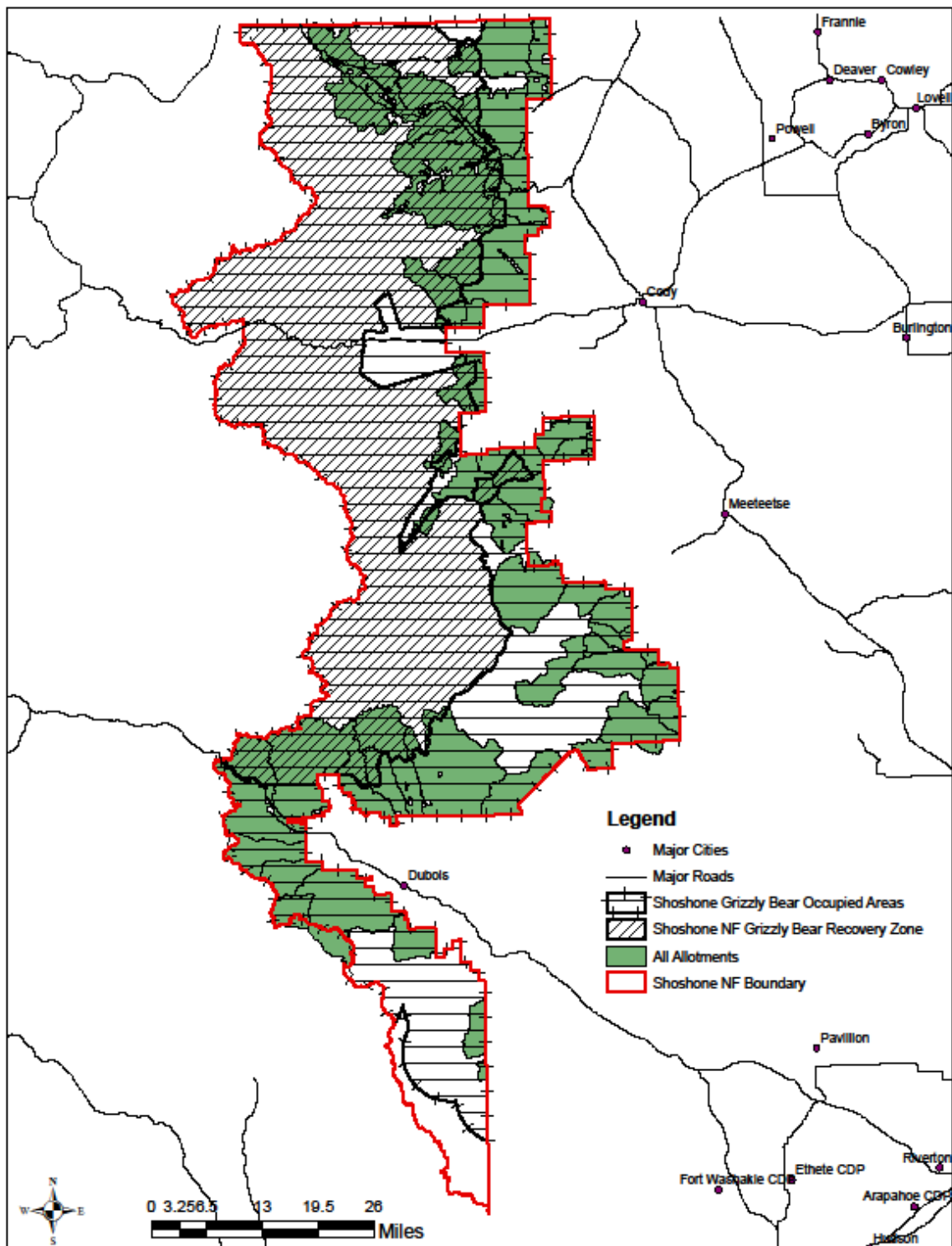


Figure BA- 5. Grizzly bear primary conservation area (recovery zone), occupied habitat and commercial livestock grazing allotments, Shoshone National Forest

Grizzly Bear Habitat Conservation on the Shoshone NF

The Final Conservation Strategy for Grizzly Bear in the Greater Yellowstone Area is the best available science and applies to National Forest System lands in the six Greater Yellowstone Area national forests that include the Shoshone. The Conservation Strategy was developed to be the document guiding management and monitoring of the Yellowstone grizzly bear population and its habitat upon recovery and delisting. Even though delisting has not occurred, this document is still used to advance the grizzly bear's recovery.

The Conservation Strategy identified five key areas that land managers are to focus on (Conservation Strategy, pp 5-11). These include:

- Population Standards and Monitoring
- Habitat Standards and Monitoring
- Management and Monitoring of Grizzly Bear/Human Conflicts
- Information and Education and
- Implementation and Evaluation

The proposed action (Forest Plan Revision) and alternatives have the potential to directly impact three of the five key areas. These three focus areas (Habitat Standards and Monitoring, Management and Monitoring of Grizzly Bear/Human Conflicts and Information and Education) and appropriate planning area-related standards will be the only ones brought forward for further discussion.

1. Habitat Standards and Monitoring Focus Area

Habitat standards include:

- Maintenance of secure habitat at 1998 levels in each bear management unit subunit through management of motorized access route building and density, with short-term deviations allowed under specific conditions. Secure habitat is defined as more than 500 meters from an open or gated motorized access route or reoccurring helicopter flight line and must be greater than or equal to 10 acres in size. The proposed action and alternatives could impact this standard, and thus, it will be discussed further.
- The number of commercial livestock allotments and number of permitted sheep will not exceed 1998 levels inside the PCA. Existing sheep allotments will be phased out as the opportunity arises with willing permittees. The proposed action and alternatives could impact this standard, thus it will be discussed further.
- Management of developed sites at 1998 levels within each bear management unit subunit, with some exceptions for administrative and maintenance needs. The proposed action and alternatives could impact this standard, thus it will be discussed further.

Habitat criteria that will be monitored and reported include:

- Monitoring open and total road motorized access route density in each bear management unit subunit inside the PCA.
- Monitoring four major food items throughout the Yellowstone area: winter ungulate carcasses, cutthroat trout spawning numbers, bear use of army cutworm moth sites, and whitebark pine cone production. The incidence of white pine blister rust in sampled areas will also be monitored

- Monitoring of habitat effectiveness in the PCA using the databases from the Yellowstone Grizzly Bear Cumulative Effects Model
- Monitoring the number of elk hunters inside the PCA
- Monitoring the number of grizzly bear mortalities throughout the Yellowstone area on private lands and development of a protocol to monitor private land status and condition
- Land managers will ensure that habitat connectivity is addressed throughout the Yellowstone area as part of any new road construction or reconstruction

2. Management and Monitoring of Grizzly Bear/Human Conflicts Focus Area

The management of grizzly bear/human conflicts inside and outside of the PCA is based upon the existing laws and authorities of the state wildlife agencies, the federal regulatory agency and federal land management agencies. Management of nuisance bears usually falls into one or more of the following categories:

- Removing or securing the attractant
- Deterring the bear from the site through the use of aversive conditioning techniques
- Capturing and relocating the nuisance bear
- Removing the bear from the wild, including lethal control

The focus and intent of nuisance grizzly bear management inside and outside the PCA will be predicated on strategies and actions to prevent grizzly bear/human conflicts

3. Information and Education Focus Area

The purposes of the information and education aspects of this cooperative effort are to support the development, implementation, and dissemination of a coordinated information and education program. This program should be understandable and useful for the people who visit, live, work, and recreate in bear habitat to minimize grizzly bear/human conflicts and to provide for the safety of people while building support for viable bear populations.

Shoshone National Forest Implementation of Habitat Standards and Monitoring Focus Area

The number of commercial livestock allotments in the PCA on the Shoshone in 1998 was 24 (Appendix F, Conservation Strategy). The current number of commercial livestock allotments in the PCA is 18, due only to combinations of allotments into a single managed allotment. In 1998, the permitted number of sheep (animal months) in the PCA was 5,387. The current number of permitted sheep animal months is 0. This is as a result of the remaining two sheep allotments being closed in 2003. The proposed action and alternatives do propose changes to this standard, therefore, this will be analyzed further.

Certain elements of four of the six monitoring requirements are a responsibility of the Shoshone. These include:

- Monitoring open and total road motorized access route density in each BMU subunit inside the PCA. The Shoshone submitted this information to the Interagency Grizzly Bear Study Team (IGBST) for 2010 on February 22, 2011. (USDA 2011).
- Monitoring four major food items throughout the Yellowstone area: winter ungulate carcasses, cutthroat trout spawning numbers, bear use of army cutworm moth sites, and whitebark pine cone production. The incidence of white pine blister rust in sampled areas

- will also be monitored. The Shoshone annually monitors established whitebark pine cone production transects and this data is used to prepare the IGBST annual report.
- Monitoring of habitat effectiveness in the PCA using the databases from the Yellowstone Grizzly Bear Cumulative Effects Model. The Shoshone submitted this information to the Interagency Grizzly Bear Study Team (IGBST) for 2010 on February 22, 2011. (USDA 2011).
 - Land managers will ensure that habitat connectivity is addressed throughout the Yellowstone area as part of any new road construction or reconstruction. No new road construction or reconstruction needed this issue addressed in 2010.

The Shoshone is in compliance with these monitoring elements. Monitoring open and total road motorized access route density in each bear management unit monitoring element could be affected by the proposed action or alternatives.

Shoshone National Forest Implementation of the Management and Monitoring of Grizzly Bear/Human Conflicts Focus Area

The following is a brief summary of the actions that the Shoshone has required within the planning area to maintain or improve grizzly bear habitat and reduce grizzly bear/human conflicts.

Food storage orders/regulations Food storage Order 04-00-104 (USDA 2004):

1. All food and refuse must be acceptably stored or acceptably possessed during daytime hours.
4. All food and refuse must be acceptably stored during nighttime hours, unless it is being prepared for eating, being eaten, being transported, or being prepared for acceptable storage.
5. Any harvested animal carcass must be acceptably stored, unless the carcass is being field dressed, transported, being prepared for eating, or being prepared for acceptable storage.
6. Camping or sleeping areas must be established at least 0.5 mile from a known animal carcass or at least 100 yards from an acceptably stored animal carcass.

Bear-resistant facilities/sanitation

The Shoshone and Wyoming Game and Fish Department have provided bear-resistant facilities (i.e., bear-resistant food boxes, food tubes, garbage containers, meat-hanging poles, panniers, etc.) at campgrounds, trailheads, dispersed campsites, and to permittees in the project area.

Information, education, and patrolling

The Shoshone annually hires a bear education specialist to coordinate and lead the bear awareness programs. Substantial information and education materials (pamphlets, brochures, signs, videos, etc.) and programs have been provided to the public at all Forest Service offices. Signs and brochures are available at campgrounds, trailheads, dispersed recreation sites, picnic areas, etc. Forests contributed financing for producing the information and education film “Living in Grizzly Country.” The forests have cooperated with State wildlife management agencies and other cooperating institutions and individuals in giving “Living in Bear Country Workshops,” which includes bear identification, safe camping, hiking, hunting, and working procedures to use in bear country, and the proper use of bear-deterrent pepper spray. Back country rangers and other back

country patrols have been used to inform and educate the public on food storage orders, and to check on compliance with these orders. Field patrols have been used during hunting seasons to reduce hunter-caused conflicts and grizzly bear mortalities, specifically within the project area.

Special grizzly bear requirements in permits

All special use permits and livestock grazing permits issued on the Shoshone contain clauses requiring protection of the grizzly bear and its habitat, and proper food storage and sanitation both inside and outside of the PCA boundary.

Grizzly Bear Population

Following the direction in the Conservation Strategy; the IGBST annually monitors unduplicated females with cubs of the year within the Greater Yellowstone Area; calculates a total population estimate for the entire Greater Yellowstone Area based on the model averaged Chao2 estimate of females with cubs of the year, monitors the distribution of females with all young in each bear management unit within the PCA and monitors all sources of mortality. The new analysis protocol for estimating total population and sustainable mortality limits were developed by the IGBST and was appended to the Conservation Strategy.

Based on the number of sightings of females with cubs of the year, the IGBST was able to differentiate 51 unduplicated females in 2010. Based on this estimate, other observation data and associated sighting frequencies, the number of females with cubs of the year in 2010 was estimated at 56 and the estimated population size was 602. This estimate of 56 exceeds the demographic objective of 48 specified in demographic criteria for the Greater Yellowstone Ecosystem and a population estimate of 602 exceeds the minimum 500 necessary to maintain the genetic needs of the population, identified in the Final Conservation Strategy (2007). Additionally, the data continued to support a linear model, indicating an increasing trend in the population (Haroldson 2011). Dispersion of reproductive females throughout the Greater Yellowstone Area is also monitored by bear management units within the PCA according to the direction in the Conservation Strategy. Eighteen of 18 bear management units contained verified observations of females with young in at least 5 years of the last 6-year period (2005 to 2010). This exceeds the minimum criteria that 16 of the 18 bear management units must be occupied by young on a running 6-year sum with no two adjacent bear management units unoccupied (Podruzny 2011).

In summary, current information indicates that this population of grizzly bears is growing at approximately 3 to 4 percent annually. While there is some debate related to the actual level of population increase since the bear was listed in 1975, all of the current information (i.e., number of unduplicated females, distribution of reproducing females, distribution of bears, informal sightings by agency personnel, and areas where nuisance bears are being managed) indicates this population has increased in both numbers of bears and the geographic area they occupy (Interagency Conservation Strategy Team 2003). The distribution of the grizzly bear population on the Shoshone in 2010 has not really changed in the last 8 years. All 13 of the grazing allotments unoccupied in the 2003 are still considered unoccupied in 2010.

Secure Habitat on the Shoshone National Forest

Maintaining or improving secure habitat at or above the 1998 levels in each bear management subunit inside and outside the primary conservation area is required under the Conservation Strategy as an objective. Secure habitat as defined in the Conservation Strategy is any contiguous area more than 10 acres in size occurring more than 500 meters away from an open or gated

motorized access route or recurring helicopter flight line. Lakes larger than 1 square mile in spatial extent are excluded from the secure analysis. No motorized access objectives are identified for areas outside the PCA in the conservation strategy. Annual reporting of changes in secure habitat is required for areas inside the PCA and in alternating years for areas outside of the PCA.

On the Shoshone, 2011 changes in secure habitat were last reported in February 2012 for areas both inside and outside the PCA. Since the 2011 monitoring report has not been finalized at this time, this BA utilized the 2010 monitoring report. In 2010, there had been no net decline in secure habitat in any of the bear management subunits in the PCA, including the Shoshone (Interagency Grizzly Bear Study Team 2011). Existing secure habitat on the SNF is displayed in Figure BA- 6 and Table BA- 9. Conversely, secure habitat had increased by 0.1 percent or more in 15 subunits from that identified in the 1998 baseline. The Shoshone increased secure habitat in five of its 10 bear management subunits (Crandall/Sunlight 1 and 3, Shoshone 1 and 3, and South Absaroka 3) (Interagency Grizzly Bear Study Team 2011). The Shoshone is in compliance with the secure habitat objective.

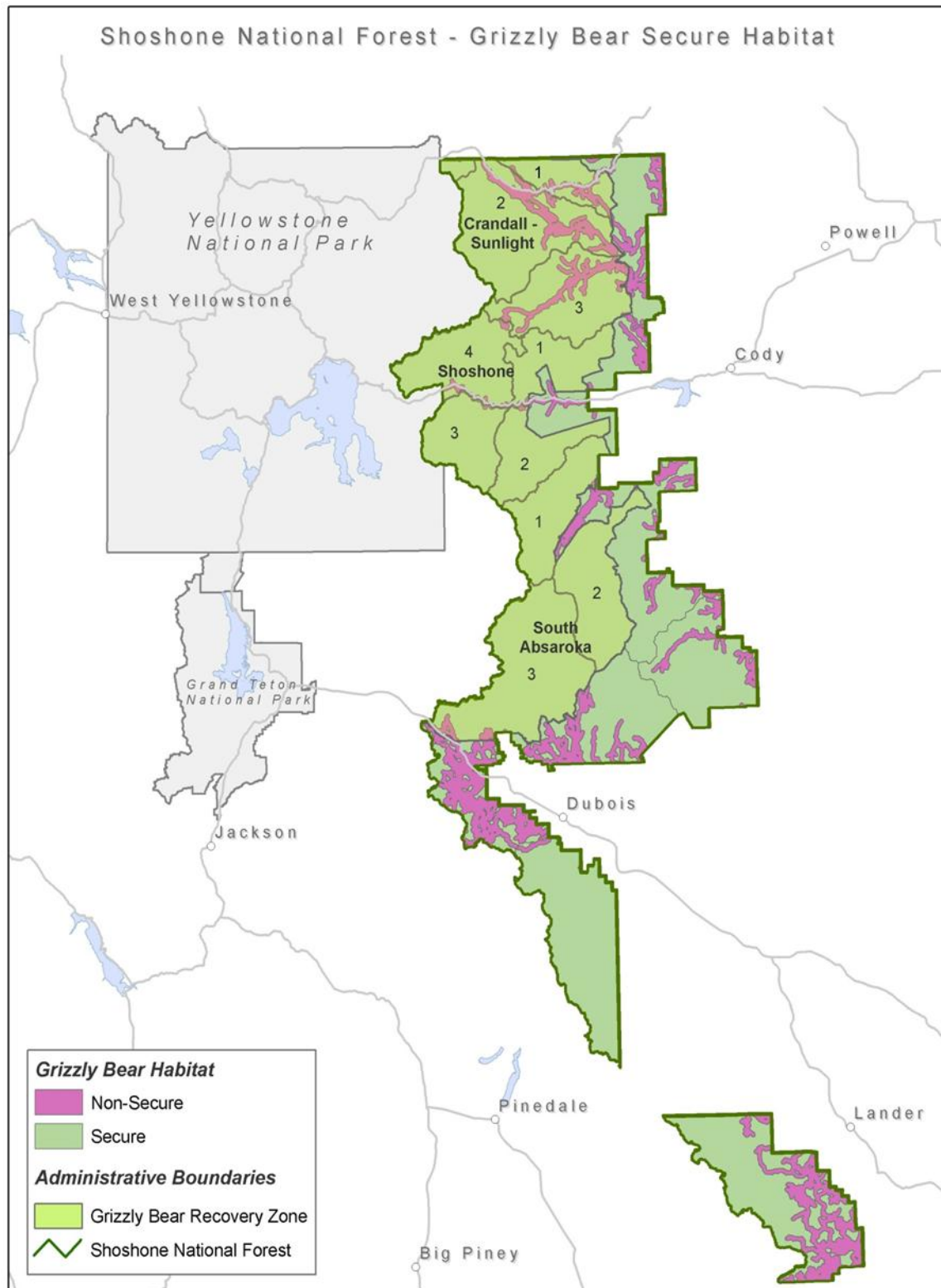


Figure BA- 6. Grizzly bear secure habitat, Shoshone National Forest

Table BA- 9. 1998 Baseline and 2010 for secure habitat for bear management unit (BMU) subunit on the Shoshone National Forest

BMU Subunit Name	Percent Secure Habitat			Square Miles Secure Habitat
	1998	2010	% Change	
Crandall/Sunlight 1	81.1	81.4	0.3	105.2/105.6
Crandall/Sunlight 2	82.3	82.3	0.0	260.3/260.3
Crandall/Sunlight 3	80.4	80.7	0.3	178.3/178.3
Shoshone 1	98.5	98.5	0.1	120.3/120.4
Shoshone 2	98.8	98.8	0.0	130.9/130.9
Shoshone 3	97.0	97.7	0.8	136.5/137.6
Shoshone 4	94.9	94.9	0.0	179.1/179.1
South Absaroka 1	99.2	99.2	0.0	161.9/161.9
South Absaroka 2	99.9	99.9	99.9	190.3/190.3
South Absaroka 3	96.8	96.8	0.0	337.1/337.2

Changes in secure habitat in areas identified by State grizzly bear management plans as biologically suitable and socially acceptable for grizzly bear occupancy are reported every 2 years on national forests outside the PCA. Since 2008, when secure habitat outside the PCA was last reported, small gains in grizzly bear secure habitat were achieved in 7 out of 43 bear analysis units, with one bear analysis unit (Warm Springs-Shoshone National Forest) reporting a slight decrease. Two of the seven bear analysis units on the Shoshone (Carter and Wood River) saw a slight increase (Interagency Grizzly Bear Study Team 2011).

The proposed action and alternatives may impact road densities within the planning area, thus it could have an effect on secure habitat.

Grizzly Bear Conflicts on the Shoshone National Forest (Planning Area)

As disclosed in the 2003 Biological Assessment for Commercial Livestock Grazing on the Shoshone NF (USDA Forest Service 2003), there were 64 grizzly bear/livestock conflicts from 1986 to 2002 and no documented bear mortalities had occurred. Conflicts with livestock have increased in recent years primarily outside of the PCA.

From 2003 to 2011, there have been 270 reported grizzly bear conflicts in the planning area (Shoshone National Forest)(Table BA- 10). A majority of these conflicts (59 percent, n=158) were from livestock injuries/depredations, followed by food habituated (21 percent, n=58), property damage (15 percent, n=40) and human injury conflict (5 percent, n=14). As a result of the 270 grizzly bear conflicts, 59 bears were killed or removed from the Shoshone (Table BA- 7).

Table BA- 10. Grizzly bear conflicts on the Shoshone NF, 2003 to 2011 (IGBST 2003—2011)

Type of Conflict	Percent	Number
Livestock	59%	158
Food Habituated	21%	58
Property Damage	15%	40
Human Injury	5%	14
	Total:	270

Grizzly bear conflicts with livestock have generally been managed according to the Grizzly Bear Guidelines and/or Conservation Strategy, which include protocols for nuisance bear management. Table BA-11 displays documented livestock conflicts for presently active allotments on the SNF since 2003. All of these allotments are grazed by cattle, as domestic sheep are no longer permitted in occupied habitat. A management action, as shown in Table BA- 11, is an action that results in a bear being killed (lethal action), trapped and relocated, or aversive-conditioned (non-lethal action). A management action also includes any action that attempts to take a bear, such as attempting to trap a bear.

Table BA- 11. Documented grizzly bear/livestock conflicts, Shoshone National Forest (2003–2011) (WGFD 2003–2011)

Allotment Name	Allotment Within PCA	No. of Grizzly Bear Depredation Conflicts since 2003	No. of Grizzly Bear Management Actions and Result of Action (lethal, non-lethal)
Bald Ridge	X	3	1 non-lethal
Basin	X	5	1 non-lethal
Bench	X	14	
Crandall and Reef Creek	X	4	
Beartooth/Face of the Mountain		12	1 non-lethal
Little Rock		3	1 non-lethal
Table Mountain	X	14	
Dick Creek		1	
Sage Creek		2	1 non-lethal
Piney		4	
Belknap		3	1 non-lethal
Rock Creek/Hardpan	X	8	
Dunior	X	9	1 non-lethal
Fish Lake		3	
Ramshorn/Parque Ck/Horse Ck	X	12	1 non-lethal
Union Pass		5	1 non-lethal
Warm Springs		6	1 lethal
Wiggins Fork		16	2 non-lethal
Wind River	X	21	3 lethal , 2 non-lethal
Bear Creek		1	
Salt Creek		6	

As can be seen from Table BA- 11, there have been 4 documented grizzly bear mortalities due to cattle grazing on the Shoshone from 2003 to 2011. Incidental take was exceeded when the second bear mortality occurred in 2010. Consultation was reinitiated in 2011, and a new take statement was received in 2012. There are several allotments where conflicts are concentrated – Bench, Beartooth/Face of the Mountain, Table Mountain, Rock Creek/Hardpan, Dunior, Ramshorn/Parque Ck/Horse Ck, Wiggins Fork and Wind River. This is an increase in conflict allotments since 2003 when only 3 of these allotments (Rock Creek/Hardpan, Dunior and Ramshorn/Parque Ck/Horse Ck) were identified in the 2003 biological assessment.

Status of the Gray Wolf

Gray wolf populations naturally fluctuate with food availability, strife within packs, and disease. Within the planning area, the main factor controlling the population is management by the USFWS for livestock/wolf conflicts.

Status of the Gray Wolf Habitat/Distribution on the Shoshone NF

The gray wolf is federally listed as a non-essential experimental population in the Yellowstone ecosystem. The species was reintroduced into Yellowstone National Park in 1995 and began dispersing onto the Shoshone in 1999. The Shoshone lies within the Greater Yellowstone Wolf Recovery Area. Concentrations of available prey occur in many areas of the Shoshone. Twelve wolf packs (Beartooth, Hoodoo, Absaroka, Pahaska, Ishawooa, South Fork, Carter Mtn., Greybull River, Gooseberry, Washakie, Lava Mountain, and East Fork) have home ranges that overlap National Forest System land on the Shoshone (Jimenez et al. 2012). In addition, there are five wolf packs (Sunlight, Elk Fork Creek, Wiggins Fork, Whiskey Basin and Pogo Agie) on the Shoshone with unidentified home ranges. Den sites for several of these packs have traditionally occurred on the Forest. Table BA- 12 depicts the composition of confirmed wolf packs and livestock depredation on the SNF in 2011.

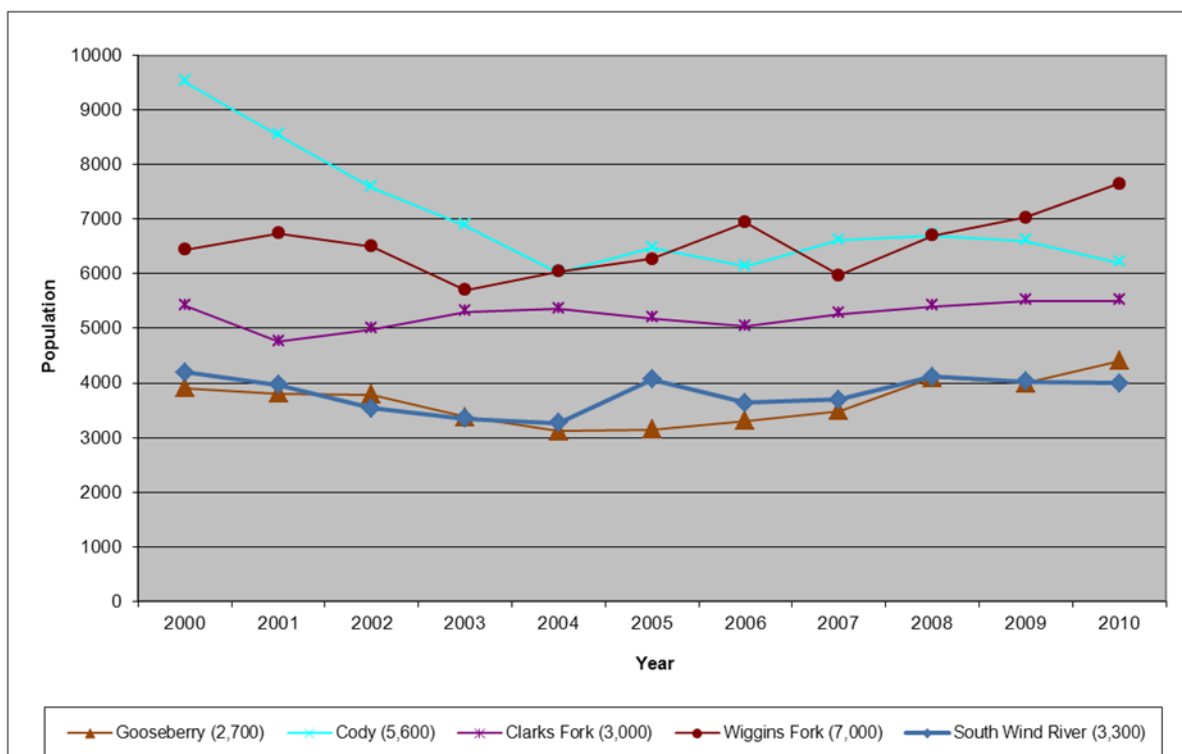
Table BA- 12. Composition of confirmed wolf packs on the Shoshone National Forest in 2011 (Jimenez et al. 2012)

Pack Size Dec 2011					
Wolf Pack	Adult	Pups	Total	Control	Depredation
Absaroka	3	0	3	2	3-cattle
Beartooth	7	4	11	2	1-cattle,1-dog
Carter Mtn.	3	0	3	0	
East Fork	3	3	6	2	1-cattle
Elk Fork Cr.	2	?	2	0	1-cattle
Gooseberry	4	4	8	0	
Greybull River	6	5	11	2	2-cattle
Hoodoo	3	1	4	4	3-cattle
Lava Mtn.	3	0	3	10	5-cattle
Ishawooa	3	4	7	0	
Pahaska	7	4	11	0	
Pogo Agie	2	0	2	0	
South Fork	4	?	4	0	
Sunlight	2	0	2	0	

**Table BA- 12. Composition of confirmed wolf packs on the Shoshone National Forest in 2011
(Jimenez et al. 2012)**

Pack Size Dec 2011					
Washakie	4	4	8	0	1-cattle
Whiskey Basin	3	0	3	0	
Wiggins Fork	2	2	4	0	1-cattle
Total	61	31	92	22	18-cattle, 1-dog

The availability of stable prey base is the primary habitat requirement for this species. Available prey (in particular elk) does exist on the forest as the Shoshone provides yearlong habitat for big game species. No trend data is available that is specific to the Shoshone, but data is available for elk herd units that encompass the Forest. Five herd units overlap the Shoshone including: Gooseberry, Cody, Clarks Fork, Wiggins Fork and South Wind River. For the most part, trends for these herds have been relatively stable and population objectives have been at or above herd unit objectives for the past 10 years (Figure BA- 7).

**Figure BA- 7. Population trends for elk herd units that encompass the Shoshone National Forest**

Wolf/Livestock Interactions within the Shoshone NF

The USFWS authorizes the USDA-Wildlife Services to manage wolf/ livestock conflicts and to remove the individuals responsible for depredations. There were 18 wolf/livestock conflicts within the Shoshone in 2012. Nine of the known packs on the Shoshone depredated on livestock in 2011 and this resulted in the lethal removal of 22 wolves. Cattle depredations followed a

seasonal pattern in 2011, with the highest number of depredations occurring in summer/fall from August through October (Jimenez et al. 2012). Losses do not reflect lost or missing livestock.

Status of the Canada Lynx and Critical Habitat on the Shoshone National Forest (Action Area)

Northern Rockies Lynx Management Direction

Following the listing of the lynx as a threatened species in March 2000 (USDI Fish and Wildlife Service 2000), the Forest Service signed a Lynx Conservation Agreement with the USFWS in 2001 to consider the Lynx Conservation Assessment and Strategy (Ruggerio et al. 2000) during project analysis and the Forest Service agreed to not proceed with projects that would be “likely to adversely affect” lynx until Forest Plans were amended. The Conservation Agreement (CA) was amended in 2006 to define occupied habitat and list the national Forests that were occupied. The conservation agreement was extended until all relevant forest plans were revised to include guidance necessary to conserve lynx. In response, the Northern Rockies Lynx Management Direction EIS ROD (NRLMD) was signed in March 2007. The management direction in the NRLMD was based upon science and recommendations in the “Ecology and Conservation of Lynx in the United States (Ruggerio et al. 2000), the Lynx Conservation Assessment and Strategy, and other publications. The purpose of the NRLMD was to incorporate management direction into land and management plans that conserves and promotes the recovery of lynx in the Northern Rockies Ecosystem. The direction applies to National Forest System lands presently occupied by lynx (Shoshone National Forest included). Plans and projects that incorporate the standards and guidelines in the NRLMD are generally not expected to have adverse effects on lynx, and implementation of these measures across the range of the lynx is expected to lead to conservation of the species.

Canada Lynx/Habitat on the Shoshone National Forest

Canada lynx have a circumboreal distribution. In North America, lynx range across most of Canada and Alaska following the boreal forest south to Colorado, Minnesota, and Maine. In Wyoming, lynx occur in the western mountains on the Bridger-Teton and Shoshone National Forests, and Grand Teton and Yellowstone National Parks (WGFD 2010).

No trend data is available that is specific to the Shoshone or Wyoming. Lynx occur at very low densities within the region. During recent surveys in the winter of 2008 to 2009, one potential track was found on the Shoshone near the Beartooth Plateau (Holmes and Berg 2009). Tracks were found on multiple occasions adjacent to the Shoshone in the Togwotee Pass area on the Bridger-Teton National Forest. During the winter of 2004 to 2005, one confirmed track detection was made on the Shoshone in the Warm Springs Creek watershed (Berg et al. 2005). The WGFD (2010) suggest that lynx released from Colorado are the only lynx left in Wyoming and that native Wyoming populations are nearly extirpated.

The Shoshone has mapped lynx habitat (Figure BA- 8) following criteria in the Lynx Conservation Assessment and Strategy (Ruediger et al. 2000), into lynx analysis units on a majority of the Forest. The entire Shoshone is considered occupied habitat. The best opportunities for snowshoe hares and lynx are on north slopes with mixed conifers, including a strong subalpine fir component. Subalpine fir retains live and dead branches close to the ground for an extended period of time.

Lynx inhabit mountainous regions at elevations ranging from 2,356 to 2,869 meters (7,730 to 9,413 feet) and on slopes of 8 to 12 percent (WGFD 2010). They usually occur within extensive stands of dense boreal forest. Older forests and dense young conifer stands provide good quality foraging habitat. About 597,000 acres have been mapped as lynx habitat within lynx analysis units on the Shoshone (Table BA- 13). Mapped lynx habitat occurs on the northern two-thirds of the Shoshone from Union Pass to Montana. The southern third of the Shoshone contains marginal habitat because of its patchiness and dry forest types.

On the Shoshone, spruce/fir habitat is relatively abundant. There are about 315,986 acres of spruce/fir on the Forest with about 30 percent of it being mature (over 200 years old) and 6 percent in the seedling/sapling stage (under 20 years old) (USFS 2012). About 20 percent (about 58,800 acres) of the lodgepole pine on the Forest is in the seedling/sapling stage (under 20 years old). This dense young lodgepole pine may provide habitat for snowshoe hares, the primary prey for lynx. Additional habitat likely exists in Douglas fir and lodgepole pine stands that are succeeding to spruce/fir.

Fire suppression has likely increased the amount of spruce/fir on the Shoshone, but also has increased the risk for large catastrophic wildfires.

Habitat and extensive winter snow survey work has been conducted for this species during the recent past on the Shoshone in partnership with the Wyoming Game and Fish Department. The areas with the most potential habitat occur in the Dubois/Togwotee Pass area (Wind River Ranger District) with more limited potential on parts of the Washakie Ranger District and in the Beartooth Mountains (Wapiti Ranger District). Tracks of two different lynx were confirmed in the Dubois/Togwotee Pass area in the winter of 2006 to 2007 and tracks of a single lynx in the Washakie Ranger District area were located. In the winter of 2008 to 2009, a possible lynx track was located in the Beartooths, just across the Wyoming/Montana state line but immediately adjacent to the Shoshone National Forest.

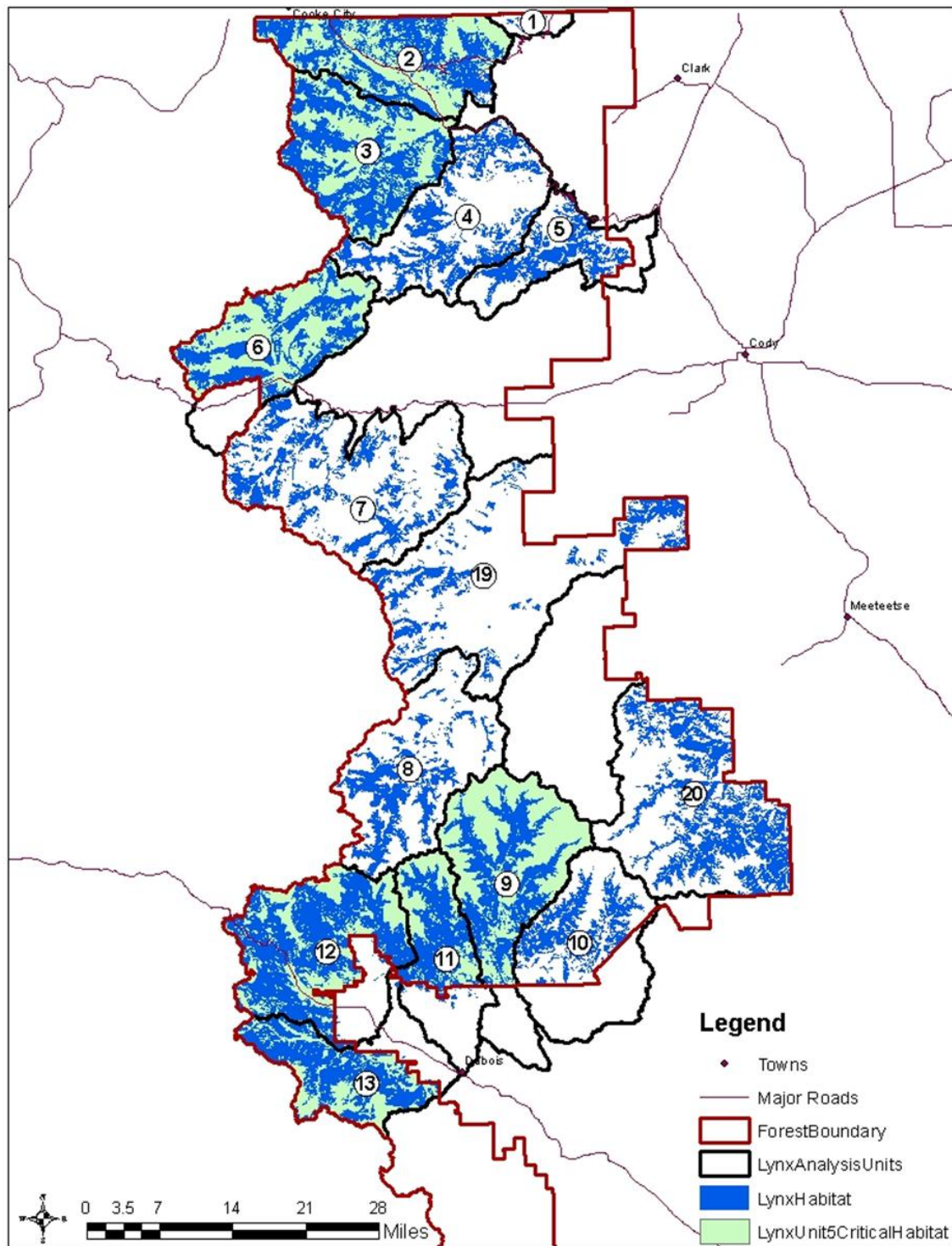


Figure BA- 8. Canada lynx analysis units and habitat (including critical habitat), Shoshone National Forest

Table BA- 13. Canada lynx habitat and critical habitat acres by lynx analysis unit

Lynx Analysis Unit (LAU)	LAU acres	Lynx Habitat acres	Critical Habitat?	Critical Habitat Acres
13	89,557.94	41,452.07	Yes	6,6327.16
12	140,364.15	74,824.85	Yes	115,607.97
11	77,505.05	29,261.36	Yes	48,629.51
10	113,604.75	24,823.18	No	
9	135,188.91	44,561.01	Yes	115,054.24
20	168,453.93	66,182.04	No	
8	125,172.79	32,239.64	No	
19	199,722.46	31,992.11	No	
7	170,207.85	43,795.53	No	
6	113,610.7	37,831.17	Yes	92,939.85
5	65,113.18	21,278.69	No	
4	120,860.06	41,074.36	No	
3	109,876.68	57,145.58	Yes	109,910.12
2	104,998.91	49,914.12	Yes	100,372.4
1	9,249.29	723.66	No	
Total	1,743,486.7	597,099.37		648,841.25

The primary risk factors from forest management are timber harvest, winter recreation and fire suppression. Natural risk factors include epidemic insect outbreaks. Habitat for lynx and their primary prey (snowshoe hare) is relatively abundant on the Shoshone, but has a patchy distribution. Continuing to manage for diverse habitats including mature spruce/fir and young densely regenerated coniferous forest is important. Continue to manage winter recreation (groomed over-the-snow trails) in lynx habitat at or below current levels would be important. Groomed trails may allow access by lynx competitors (i.e., bobcat and coyote) into lynx habitat.

Lynx are adapted to deep powder snow conditions. Climate change has the potential to reduce Canada lynx populations and habitat on the Shoshone. Lynx have low adaptability potential and narrow environmental tolerance, which make them susceptible to climate change (Rice et al. 2011).

Canada Lynx Critical Habitat on the Shoshone NF

The USFWS designated critical habitat for lynx on February 25, 2009. Five lynx critical habitat units were selected in the United States that provide adequate habitat elements for lynx. The Yellowstone area is Unit #5, which is slightly over 6 million acres. The majority of Shoshone National Forest (and all mapped lynx habitat) is included in critical habitat with the exception of the Washakie Ranger District (Lander)(Figure BA- 8). About 648,841 acres of critical habitat has been designated on the Forest (Table BA- 13). Not all critical habitat is mapped as lynx habitat, thus the difference in the figures in Table BA- 13. The acre differences are due to matrix habitat which makes up a portion of the primary constituent element for lynx (boreal forest landscapes) (Federal Register /Vol. 74, No. 36, pp 8638). Unit #5 also includes Yellowstone National Park and surrounding lands in southwestern Montana and northwestern Wyoming.

Adverse modification of critical habitat is defined as “a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.” Therefore, an analysis for adverse modification must be applied at a survival and recovery scale.

9.0 Effects of action and determination of the effects

Grizzly bear

Effects on Secure Habitat

Research has shown that secure habitat (areas that are free of motorized access) is an important component of grizzly bear habitat (Interagency Grizzly Bear Committee 1998). Secure habitat is defined as areas more than 10 acres in size and more than 500 meters from an open or gated motorized access route or recurring helicopter flight line¹⁹. Alternatives A-E provides secure habitat for the grizzly bear both inside and outside the PCA and they all provide the most secure habitat with no allowance for management activities that would decrease the secure habitat. These alternatives would be consistent with the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007*. Alternative F proposes to eliminate the security requirement for grizzly bears. Alternative F would have the greatest effect on this species, would be inconsistent with how secure habitat is managed in the Greater Yellowstone Ecosystem and would be inconsistent with the *Final Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007*. Existing secure habitat in Alternatives A-E is at 93 percent (Table BA- 9), while secure habitat in Alternative F would be reduced to 0 percent. Alternatives A-E would allow varying amounts of management activities within portions of the existing secure habitat that could temporarily or permanently decrease the amount of secure habitat. Under Alternative F, management activities would not be restricted for grizzly bears with regards to secure habitat management.

Within the PCA on the Shoshone NF

There are 1,801.6 square miles of secure habitat on Shoshone National Forest System lands within the PCA (Table BA- 9). The maximum allowable temporary change to secure habitat for a project cannot exceed 1 percent of the area of the largest subunit within the bear management unit (Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007)

All Alternatives, except Alternative F, maintain or increase the amount of long-term secure habitat but allow changes in the secure habitat according to the 1 percent rule. Under Alternatives A-E, any secure habitat affected by the 1 percent rule would be restored after project completion. Under Alternative F secure habitat direction would be eliminated.

Alternative A (the Shoshone’s Forest Plan 1986, as amended) has a standard for no net increase in roads. The activity levels associated with Plan objectives are relatively low. In practice, secure habitat is being maintained or increased under this alternative. The amount of secure habitat has increased in Shoshone BMU subunits 3 and 4 due to road closures in the North Fork Shoshone River corridor. The amount of secure habitat has stayed the same in all other BMU subunits. Currently, 93 percent of the National Forest System land within the PCA is secure habitat (Table BA- 9).

In Alternative A, the standard for no net increase in roads would result in stable amounts of secure habitat. The location of secure habitat could change over time when roads are constructed in some areas and closed in other areas to meet the standard of no net increase.

For Alternatives B-E, the existing secure habitat (1,137,000 acres, 93 percent of the National Forest System land within the PCA) would be maintained, with the allowance of the 1 percent rule to accomplish various management objectives

For Alternative F, there would be no standard for secure habitat within the PCA. This alternative would not be in compliance with the Conservation Strategy and would have negative influences on the grizzly bear due to the potential loss of secure habitat for the species.

Effects on Denning Habitat

Within the Shoshone, there is over 567,000 acres of grizzly bear denning habitat with the PCA (Podruzny et al. 2002) (Table BA- 14).

Table BA- 14. Grizzly bear denning habitat in thousands of acres, closed to snow machine use within the PCA, Shoshone National Forest

Acres of denning habitat	Acres (%) closed to snow machine use					
	Alt. A	Alt. B	Alt. C	Alt. D	Alt. E	Alt. F
731	567(78%)	567(78%)	940(100%)	723(99%)	521(71%)	222(30%)

As displayed in Table BA- 14, within the PCA, 78 percent of the grizzly bear denning habitat would be closed to snow machine use in alternatives A and B. As expected and following their themes, alternatives C and D increase the amount of denning habitat closed to snow machine use, while both alternatives E and F decrease the amount of habitat. Alternative F has the potential to have the greatest impact on denning habitat for grizzly bear.

A 2002 biological opinion from the USFWS requires all forests in the Greater Yellowstone Area, except the Caribou-Targhee, to monitor winter snowmobile use around grizzly bear denning sites and to confer with the USFWS and IGBST regarding any necessary mitigation (USDI FWS 2002 in grizzly bear amendment). There have been no documented conflicts or mortalities associated with denning grizzly bears that can be linked to snow machine activity (USDA Forest Service 2001a in grizzly bear amendment). As displayed in Table BA- 7, there have been no disturbance/incidental take effects on grizzly bears from snow machining on grizzly bears on the Shoshone. Therefore, in alternatives A-E, potential impacts to grizzly bears from snow machine use would be expected to be low while effects from alternative F could be moderate.

Effects on grizzly bear/human interactions

Effects on grizzly bear/human conflicts and displacement associated with developed sites

Developed sites in grizzly bear habitat increase the potential for conflict with humans primarily due to the potential availability of human foods. Developments also reduce the effectiveness of the natural habitat near these sites. Dominant bears sometimes displace subordinate bears into less desirable habitat, resulting in increased conflicts compared to bears using habitats farther away from developed sites. The larger the developed site and the more people using the site, the greater

the potential for conflicts and reduction in the effectiveness of the adjacent habitat for bears (Mattson et al.1987 in grizzly bear amendment).

Inside the PCA on the Shoshone National Forest

Developed sites on the Shoshone inside the PCA are displayed in Table BA- 15 as depicted in the Conservation Strategy for the Grizzly Bear in the Greater Yellowstone Area 2007. Forest Service food storage regulations minimize the potential for grizzly bear/ human conflicts independent of the alternatives. Minerals development under the 1872 General Mining Law would be permitted and mitigated as possible.

Table BA- 15. The 1998 baseline for numbers of developed sites on the Shoshone National Forest within each bear management unit

Subunit	Permitted Summer home complex	Developed campgrounds	Trailheads	Major Developed Sites and lodges	Admin. or maintenance sites	Other developed sites	Plans of operations for mineral activities
Crandall/Sunlight #1	0	2	5	1	1	5	0
Crandall/Sunlight #2	0	5	4	1	2	5	1
Crandall/Sunlight #3	0	2	3	0	1	2	0
Shoshone #1	1	2	0	0	0	6	0
Shoshone #2	0	0	1	1	0	0	0
Shoshone #3	2	0	1	1	0	0	0
Shoshone #4	3	3	3	6	0	8	0
South Absaroka #1	0	0	0	0	0	0	0
South Absaroka #2	0	0	0	0	2	0	0
South Absaroka #3	1	3	4	1	1	4	0
Total	7	17	21	11	7	30	1

Alternatives A-F. Recreation use and associated demand for developed sites is expected to increase. Increases in capacity and the number of developed sites would not be allowed unless it were determined that there were no impacts to grizzly bears or the impacts could be mitigated effectively within the same BMU subunit. Conflicts at developed sites would likely remain at current levels or decrease, and the acreage of impacted habitat would decrease or remain at 1998 levels.

Consultation with the USFWS would be required under All Alternatives for projects that may affect the grizzly bear. Should the grizzly bear be delisted, a biological evaluation would be required under All Alternatives for projects that may affect the grizzly bear as a regional sensitive species. The number and capacity of developed sites would likely increase outside the PCA under all Alternatives. Grizzly bear/human conflicts would increase outside the PCA as bears expand their range even with the existing level of developed sites. An increase in number and capacity of developed sites would further increase the potential for conflicts and displacement.

Effects on Grizzly Bear/Livestock Conflicts

Inside the PCA on the Shoshone National Forest

In 1998, there were 24 commercial livestock allotments in the PCA on the Shoshone (Appendix F, Conservation Strategy). The current number of commercial livestock allotments in the PCA is 18, due only to combinations of allotments into a single managed allotment. In 1998, the permitted number of sheep (animal months) in the PCA was 5,387. The current number of permitted sheep animal months is 0. This is as a result of the remaining 2 sheep allotments being closed in 2003. Grizzly bear/livestock conflict data is displayed in Table BA- 11.

Alternatives A, B, and D. The number of commercial livestock allotments would remain unchanged under these alternatives and would be consistent with this standard in the Conservation Strategy. Sheep animal unit months would remain below 1998 levels inside the PCA. Conflicts with grizzly bears and domestic sheep have been eliminated. No new allotments would be created in the PCA and numbers of cattle would likely remain close to and/or below 1998 levels in existing allotments. Conflicts with cattle would likely continue at current levels, and any potential for increase in conflicts would not be a result of new allotments. Cattle numbers could increase in existing allotments, although any increases would likely be minor. Under these alternatives, cattle allotments with recurring conflicts that could not be resolved through modification of grazing practices would be retired as opportunities arise with willing permittees. As allotments with recurring conflicts are retired and as grizzly bear expansion stabilizes, conflicts would decrease.

Similar to alternative A, the past level of conflicts and grizzly bear mortalities has not precluded achieving recovery of the grizzly bear and, in addition, sheep conflicts have been eliminated.

Alternative C. The number of commercial livestock allotments and sheep animal unit months would remain unchanged as in alternatives A, B, and D. and would be consistent with this standard in the Conservation Strategy. No new allotments would be created in the PCA. Under alternative C, numbers of cattle would decrease by 44 percent and would be below 1998 levels in existing allotments. Conflicts with cattle would likely decline as recurring conflict areas could be retired or closed. Under this alternative, cattle allotments with recurring conflicts that could not be resolved through modification of grazing practices would be retired as opportunities arise with willing permittees. As allotments with recurring conflicts are retired and as grizzly bear expansion stabilizes, conflicts would decrease.

Similar to alternative A, the past level of conflicts and grizzly bear mortalities has not precluded achieving recovery of the grizzly bear and, in addition, sheep conflicts have been eliminated.

Alternative E. The number of cattle animal unit months would increase under this alternative by 20 percent above alternative A. This would be accomplished within the existing number of allotments. Portions of these allotments lie within the PCA. This alternative would be consistent with the 1998 baseline standard as the number of allotments is not increased and no increase in sheep animal unit months. Due to the increase of livestock, this alternative would result in increased conflicts with grizzly bears.

Recovery of the grizzly bear would be set back by this alternative as the number of conflicts and results of the conflicts would have increased negative impact on the species.

Alternative F. The number of commercial livestock allotments and cattle animal unit months would increase under this alternative. Seven allotments that are currently vacant would be made

available for livestock grazing and increase animal unit months by approximately 25 percent over alternative A. Portions of these allotments lie within the PCA. This alternative would not be consistent with the 1998 baseline standard in the Conservation Strategy and would result in increased conflicts with grizzly bears.

Recovery of the grizzly bear would be set back by this alternative as the species would no longer be managed consistently in the Greater Yellowstone Ecosystem.

Outside the PCA on the Shoshone National Forest

Outside the PCA, there are currently 39 active cattle allotments and 2 active sheep allotments (U.S. Forest Service 2011, Grazing BA Table 2 and 3). During the years 2003 through 2011, there were 12 cattle allotments and no sheep allotments (30 percent of the active allotments) with documented grizzly bear conflicts.

Alternatives A, B, C, D, and E. The existing sheep allotments would be maintained. There have been no grizzly bear conflicts on the existing sheep allotments. Grizzly bear conflicts are expected on the 12 cattle allotments outside the PCA that have had previous conflicts, and are anticipated on some but not all of the other cattle allotments if the grizzly bear population expands into these areas. Both cattle and sheep conflicts would be handled under State nuisance grizzly bear guidelines. These nuisance grizzly bear guidelines allow a variety of management actions, depending on site-specific conditions and situations. Conflicts would likely increase under all five alternatives outside the PCA as bears continue to expand their range. Consultation with the USFWS would be required under all alternatives, until the grizzly bear is delisted.

Alternative F. The number of commercial sheep allotments is increased and the numbers of cattle are increased under this alternative. Grizzly bear conflicts would occur on the new sheep allotments and conflicts are also expected on the 12 cattle allotments outside the PCA that have had previous conflicts, and are anticipated on some but not all of the other cattle allotments if the grizzly bear population expands into these areas. Both cattle and sheep conflicts would be handled under State nuisance grizzly bear guidelines. These nuisance grizzly bear guidelines allow a variety of management actions, depending on site-specific conditions and situations. Conflicts would likely increase under all five alternatives outside the PCA as bears continue to expand their range. Consultation with the USFWS would be required under all alternatives until the grizzly bear is delisted.

Effects on the Grizzly Bear Population

Effects Common to All Alternatives

All alternatives provide some level of protection to grizzly bear habitat; the quantity and quality of available habitat are only two of the factors that influence total population numbers. Controlling human-caused mortality has been key to increases in bear numbers over the last 25 years. Human-caused mortality, coupled with the amount of effective habitat, would be the ultimate limiting factors for the grizzly bear population in the Greater Yellowstone Area.

Coordinated management of nuisance bears, food storage orders, information and education efforts, and the availability of Forest Service facilities to store food unavailable to bears would minimize conflicts and grizzly bear mortalities under all alternatives.

Grizzly bear/human conflicts and human-caused mortalities would likely increase with increased contact between bears and humans on the six national forests. Many of the grizzly bear/human

conflicts occur on private lands in the Greater Yellowstone Area, where the Forest Service has no authority to require food storage.

Recreational use of National Forest System lands is expected to increase over the next decade as the human population in the counties in the Greater Yellowstone Area continues to grow.

Weather conditions play a key role in the yearly availability of foods for bears, which in turn affects female fecundity (fertility) and cub survival (Schwartz et al. 2005). In poor food years, bears often seek non-traditional foods and end up in conflicts with humans, increasing the risk of mortality. Regardless of the amount of habitat protection, weather conditions would still influence the basic productivity of the land and the foods available to bears and ultimately the carrying capacity of the landscape for grizzly bears.

Future minerals development could impact grizzly bears, but would be minimized by mitigation efforts.

Cumulative Effects of the Proposed Action and Alternatives on Grizzly Bears

Cumulative effects as defined by the Endangered Species Act are those effects of future State or private activities, not involving Federal activities that are reasonably certain to occur within the action area of the Federal action (50 CFR 402.02).

Livestock grazing is an identified potential threat to grizzly bear conservation that contributes to cumulative adverse effects, due primarily to control actions when grizzly bear/livestock conflicts occur. Most grizzly bears that persistently kill livestock are eventually euthanized or otherwise removed from the population (Reinhart et al. 2001). Although many conflicts in the Greater Yellowstone Area were associated with livestock depredations, most of these were resolved without bear mortalities (Interagency Grizzly Bear Study Team 2000). This is very similar on the Shoshone, where from 2003 through 2011, there were 152 grizzly bear/livestock conflicts that resulted in 4 bear mortalities. As grizzly bear populations expand outside the PCA, the proportion of livestock depredations occurring outside the PCA have increased, especially since there are more livestock grazing operations outside the PCA than inside. With the existence of the nuisance bear policy in effect outside the PCA in Wyoming, it is likely that more grizzly bears will be killed when livestock depredations occur.

In addition to the grazing activities that may influence grizzly bears and their habitat on the Shoshone National Forest, other private or State-permitted activities are reasonably certain to occur within the immediate influence zone that would result in cumulative effects to the grizzly bear. The activities that are likely to occur on private and State land within close proximity to the Shoshone are presented below. The primary State-permitted activity that will occur on public and private land is regulated wildlife hunting/trapping and fishing seasons. This activity will likely remain the same or increase slightly, and thus, the potential for grizzly bear/human conflicts will likely increase, particularly as the grizzly bear increases in numbers and distribution. Of the 59 human-caused grizzly bear mortalities on the Shoshone from 2003 through 2011, 54 percent were hunting related. This is a 17 percent increase since 2003. One of the greatest causes of grizzly bear mortalities in recent years is self-defense in fall by big game hunters. Black bear hunting using bear baiting techniques will continue and possibly increase on State and private lands near the Shoshone. This is another potential source for grizzly bear/human conflict and human-caused grizzly bear mortality. The proposed action and alternatives are not expected to have any influence on or be affected by these non-Forest Service permitted or regulated activities.

Additional activities that will likely occur in the immediate influence zone include actions on private inholdings and private lands adjacent to the Shoshone. Livestock grazing on public lands is a long tradition of western culture and the use of public lands has been a key component of viable ranching operations. Working ranches are an important part of the landscape as they provide large expanses of habitat essential to the conservation of grizzly bears. The importance of working landscapes should not be minimized as they are not only vital to the grizzly bear, but many wide-ranging species. Should there be a loss of our working landscapes; the fragmentation of wildlife habitat would have long-term adverse impacts to grizzly bears. Examples include construction of homes and development of residential subdivisions. This can reduce or fragment available bear habitat and reduce its effectiveness due to human disturbance. In these human activity areas, bears can become human-habituated and food-conditioned, which will lead to increases in grizzly bear/human conflicts, particularly as bears increase in numbers and distribution.

Private and State lands that currently have livestock grazing occurring will likely continue to have livestock grazing, and these actions can have similar effects that have and can occur relative to livestock grazing on the Shoshone. Loss of, displacement from, or decrease in value of available habitat can occur from increased development on private lands related to oil and gas exploration and development and recreational developments. With these increases in developments on the periphery of the Shoshone, there will be increases in recreational activities on both private and public lands, which can lead to increases in grizzly bear/human conflicts and cumulative effects.

Determination of Effects and Rationale for the Determination

Under alternatives A-E, management activities such as livestock grazing, recreation, and vegetation management inside the PCA and in areas occupied by grizzly bears have been identified as a risk factor that will likely affect individual bears and may affect grizzly bear populations. Management activities are guided by the habitat standards that limit changes to grazing allotments, developed sites and secure habitat. It is likely that only a small number of grizzly bears will be affected by grazing activities and the potential adverse effects can be minimized through adherence to the terms and conditions. Grizzly bear populations have expanded and are expected to continue to expand throughout the Shoshone. The high potential for grizzly bear/human and grizzly bear/livestock interactions to continue and the resulting control actions, it is the conclusion and determination that this action (alternatives A-E), “**may affect, likely to adversely affect**” individual grizzly bears. As a result of this determination, formal consultation would be required.

Alternative F would remove any secure habitat requirements for grizzly bears and increase the number of commercial grazing allotments. There is an expected increase in bear/livestock conflicts. Developed sites are guided by the habitat standards that limit changes to the number of sites. Expansion of the grizzly bear population in the PCA would not occur. The high potential for grizzly bear/human and grizzly bear/livestock interactions to continue and the resulting control actions, it is the conclusion and determination that this action (alternative F), “**may affect, likely to adversely affect**” individual grizzly bears. As a result of this determination, formal consultation would be required.

Gray Wolf

Direct and Indirect Effects

Alternatives A, B, and D. The number of animal unit months would remain unchanged under these alternatives. Conflicts with livestock would likely continue at current levels, and any potential for increase in conflicts would not be a result of increased allotments. Cattle numbers could increase in existing allotments, although any increases would likely be minor. Similar to alternative A, the past level of conflicts and wolf mortalities has not precluded achieving recovery of the gray wolf and, in addition, sheep conflicts have been eliminated.

Alternative C. Cattle numbers would decrease by 35 to 45 percent from alternatives A, B, and D, and conflicts with cattle would likely decline as recurring conflict areas could be retired or closed.

Similar to alternative A, the past level of conflicts and gray wolf mortalities have not precluded achieving recovery of the gray wolf and, in addition, sheep conflicts have been eliminated.

Alternative E. Cattle numbers would increase by 25 percent over the existing amount of animal unit months on the Shoshone. This increase in livestock numbers has the potential to increase the amount of wolf/livestock conflicts in areas that already have had conflicts.

Similar to alternative A, the past level of conflicts and gray wolf mortalities has not precluded achieving recovery of the gray wolf and, in addition, sheep conflicts have been eliminated.

Alternative F. The number of commercial livestock allotments is increased by 40 percent and cattle animal unit months would increase under this alternative by 26 percent. Seven allotments that are currently vacant would be made available for livestock grazing. This increase in livestock numbers has a greater potential to increase wolf/livestock conflicts of all the all alternatives.

While it is difficult to predict, nonetheless, recovery of the gray wolf under this alternative has the potential to be set back under this alternative.

Effects Common to All Alternatives

Livestock/wolf conflicts are likely to continue. Conflicts may result in direct mortality of individuals responsible for depredations. Since pack social structure is very adaptable and resilient, breeding members can be quickly replaced either from within or outside the pack and pups can be reared by another pack member should their parents die (Packard 2003, p. 38; Brainerd et al. 2008; Mech 2006, p. 1482 in USDI Fish and Wildlife Service 2009).

Consequently, wolf populations can rapidly recover from severe disruptions, such as very high levels of human-caused mortality or disease. After severe declines, wolf populations can more than double in just 2 years if mortality is reduced; increases of nearly 100 percent per year have been documented.

The wolf population met its recovery goals in 2002, and wolves continue to increase in number and distribution. The species has been proposed for de-listing. The biggest impact to wolves at this point is management removals due to livestock conflicts, both on public and private land.

The Shoshone grazing program contributes indirectly to these management removals, by providing the livestock that wolves are attached to as prey. The allotments in this analysis have had conflicts that resulted in management removal of wolves. Generally on the Shoshone, when wolves are removed, they are replaced quickly with offspring dispersing from other packs, so the removals are not leading to overall population decline. This is a short-term population reduction

as recruitment fills in the voids. These removals because of livestock depredation have had a minor effect to the total wolf population.

Cumulative Effects of the Proposed Action and Alternatives on the Gray Wolf

Livestock grazing on State and private land is an identified potential threat to gray wolf conservation that contributes to cumulative adverse effects, due primarily to control actions when wolf/livestock conflicts occur. In Wyoming in 2011, 35 percent of all wolf depredations on livestock occurred on private land. Control actions in response to confirmed livestock depredations includes trapping and radio collaring wolves; intensive monitoring; issuing Less-than-Lethal Munitions (rubber bullets) to harass wolves; lethally removing wolves through agency control actions; and issuing 16 Shoot-on-Sight (SOS) permits to livestock producers. No wolves were killed in 2011 using SOS permits. Non-lethal control was routinely considered but was often not applicable or cost effective in many areas in Wyoming due to: (1) specific wolf packs chronically killing livestock year after year; (2) unpredictable travel patterns and movements by wolves; and (3) very large wolf home ranges that cover vast areas including public grazing allotments. When non-lethal control methods were not effective, wolves were killed through agency control actions in an attempt to prevent further livestock depredations (Jimenez et al. 2012).

Determination of Effects and Rationale for the Determination

Based on the documented increase in the wolf population throughout the NRM annually since 2002 and related increase in the Wyoming population (see Status of Gray Wolf section) even after numerous management removals due to livestock depredations; the proposed action and alternatives may continue to result in management removal of wolves responsible for livestock depredation, but these mortalities are “**not likely to jeopardize**” the continued existence of the species.

Canada Lynx and Canada Lynx Critical habitat

Direct and Indirect Effects

The direction in the Northern Rockies Lynx Management Direction (NRLMD) applies to National Forest System lands presently occupied by lynx (Shoshone National Forest included). Plans and projects that incorporate the Standards and Guidelines in the NRLMD are generally not expected to have adverse effects on lynx, and implementation of these measures across the range of the lynx is expected to lead to conservation of the species.

Effects analyses at the national forest planning scale were completed in the Final Environmental Impact Statement NRLMD (March 2007). A review of the potential effects of alternatives A-F was completed for this analysis to look for consistency between this proposal and the NRLMD. Two resource areas are not consistent with the NRLMD and their effects are discussed below.

Alternative A. This alternative incorporates the Northern Rockies Lynx Management Direction as it amended Forest Plans in March 2007 and has no additional effects than what was disclosed in the FEIS, NRLMD. This alternative is not expected to have adverse effects on Canada lynx or Canada Lynx Critical Habitat. The amount of existing snowmobile trails remains at 276 miles.

Alternatives B-E. These alternatives incorporate the Northern Rockies Lynx Management Direction as it amended Forest Plans in March 2007 with the addition of including 2,130 acres of precommercial thinning in lynx habitat for the next 10 to 15 years. The amount of snowmobile

trails remains the same as alternative A, at 276 miles except for alternative C, which decreases the amount of trails to 163 miles.

The effects of these acres were analyzed in the FEIS, NRLMD under alternative D but were not brought forward under the Selected Alternative (Alt. F, Scenario 2). Documentation was not found by this biologist, why these acres were dropped from the Selected Alternative in the FEIS, NRLMD nor why the Shoshone did not receive any acres of precommercial thinning in lynx habitat. The effects of these acres have not changed since the analysis in the FEIS, NRLMD and are summarized below for this biological assessment.

- Precommercial thinning reduces stem densities to increase the growth of the remaining trees. Precommercial thinning generally occurs when forests are 10-30 years old, about the time young regenerating forests are beginning to provide winter snowshoe hare habitat.
- Precommercial thinning may reduce stem densities and cover to the point that the young trees have little to no value for snowshoes (Ruggiero et al. 2000a). Researchers found precommercial thinning decreased snowshoe hare abundance, compared to unthinned stands (control plots) and areas where 80 percent of the stand was thinned but 20 percent was unthinned (Griffin and Mills 2007).
- Declines in the number of snowshoe hares in the second winter after treatment occurred. In addition, estimated survival rates decreased as individuals spent proportionately more time in open young and open mature forests (Griffin and Mills 2007).

The amount of lynx habitat that has the potential to be impacted under these alternatives is less than 1 percent of all lynx habitat on the forest. The amount of Canada Lynx Critical Habitat affected is also less than 1 percent. These alternatives are not expected to have adverse effects on Canada lynx or Canada Lynx Critical Habitat.

Alternative F. This alternative incorporates a majority of the Northern Rockies Lynx Management Direction as it amended Forest Plans in March 2007 with the inclusion of 2,130 acres of precommercial thinning in lynx habitat for the next 10 to 15 years. In addition, this alternative eliminates any direction for winter motorized activity restrictions in lynx habitat by eliminating Objective HU 01, Guideline HU G11, and Guideline HU G12 from the NRLMD Record of Decision (2007) and increases the amount of snowmobile trails by 91 miles more than alternative A, to 367 miles.

The effects of adding 2,130 precommercial thinning acres is the same as alternatives B-E discussed above.

Objective HU 01, Guideline HU G11, and Guideline HU G12 all deal with snow compacting activities and designated over-the-snow routes. In the FEIS, NRLMD (page 175) the main issue addressed with regards to snow compaction was whether this activity would allow competing carnivores—primarily coyotes but also mountain lions and bobcats- winter access along compacted routes into lynx habitat, where they hunt. Based on the effects analysis in the FEIS, NRLMD, it was determined that there was still no conclusive evidence that, if competition exists between lynx and other predators, it exerts a population-level threat on lynx.

Winter recreation such as snowmobiling, cross-country skiing, dog-sledding, and snow-shoeing compacts snow throughout the winter in some places, potentially increasing the access other

predators have into lynx habitat (Halfpenny et al. 1999). These activities are increasing in lynx habitat.

About 276 miles of designated snowmobile and cross-country trails exist in the planning area. All are in lynx habitat. These activities compact the snow and may provide access for competing predators to areas with deep snow. This alternative proposes to increase the amount of snowmobile trails to 367 miles. However, grooming winter trails is likely to remain at current levels for the next 3 to 5 years because the amount of money available for grooming is not likely to increase substantially.

Mining or energy development may change or eliminate lynx habitat, and can promote winter access. Access roads may be plowed during winter, improving access for competing predators into lynx habitat. These activities are likely to be localized since there is no information to indicate that mining or energy development poses a threat to lynx populations as a whole (USDA Forest Service 2007). There are no proposed mining or energy developments in any of the alternatives.

Cumulative Effects of the Proposed Action and Alternatives on Canada Lynx

All the alternatives incorporate management direction—to varying degrees—that would reduce or eliminate adverse effects from management actions in the planning area. The alternatives incorporate management direction to address programmatic direction for certain activities. For example, national policy and congressional intent has established that reducing fuels within the wildland urban interface, as well as other areas, is an important focus on National Forest System lands. Because of this focus, the effects from these programs (e.g., National Fire Plan) on lynx have been evaluated, including their potential cumulative effects. Activities on corporate and small private lands could still adversely affect lynx; however, the management direction requires consideration of activities on private land when evaluating the effects of projects on the Shoshone.

Determination of Effects and Rationale for the Determination on Canada lynx

Under alternatives A-E, management activities such as winter recreation and vegetation management in habitat occupied by lynx have been identified as a risk factor that will likely affect individual lynx. Management activities are guided by the habitat standards that limit changes to lynx habitat. Canada lynx exist on the Shoshone in very low densities. As a result of the effects analysis, it is the conclusion and determination that this action (alternatives A-E), “**may affect, but is not likely to adversely affect**” individual Canada lynx. As a result of this determination formal consultation would not be required.

Under alternative F, snow compaction activities on trails would increase by 33 percent as a result of increased miles of snowmobile trails. Vegetation management activities in habitat occupied by lynx are guided by the habitat standards that limit changes to lynx habitat. Canada lynx exist on the Shoshone in very low densities. As a result of the effects analysis, it is the conclusion and determination that this action (alternative F), “**may affect, likely to adversely affect**” individual Canada lynx. As a result of this determination formal consultation would be required.

Determination of Effects and Rationale for the Determination on Canada Lynx Critical Habitat

Adverse modification of critical habitat is defined as “a direct or indirect alteration that appreciably diminishes the value of critical habitat for both the survival and recovery of a listed species.” Based on the information above, alternatives A-E will not impact a measurable amount

of critical habitat in Unit #5 (Greater Yellowstone Area). There would be insignificant affects to the function of the critical habitat unit and the primary constituent elements for lynx for example prey, reproduction and denning habitat, and snow conditions that give lynx competitive advantage. This is because there is little to no change to the function of the Greater Yellowstone Area critical habitat unit and the primary constituent elements. Therefore, alternatives A-E “**may affect, but are not likely to adversely affect**” Canada Lynx Critical Habitat.

Based on the above information, alternative F has the potential to impact a measurable amount of critical habitat on the Shoshone and in Unit #5 (Greater Yellowstone Area). There would be insignificant affects to the function of the critical habitat unit and the primary constituent elements for lynx except for a decrease in snow conditions that give lynx competitive advantage. This is because alternative F proposes to increase the miles of snowmobile trails by 33 percent. Therefore, alternative F “**may affect, likely to adversely affect**” Canada Lynx Critical Habitat.

10.0 Literature Cited

- Anderson, Chuck R., Mark A. Ternent, David S. Moody, Mark T. Bruscino, and Damien F. Miller. 1997. Grizzly Bear-Cattle Interactions on Two Cattle Allotments in Northwest Wyoming. Trophy Game Section, Wyoming Game and Fish Department, Laramie, WY. 78 pp.
- Barber, K. 1995. Supplemental Assessment to the Biological Assessment for the Whooping Crane (*Grus americana*). 2 pages.
- Berg, N.D., J. Burghardt, R. Gray, and B. Smith. 2005. The greater Yellowstone lynx study: 2004/2005 annual report. Endeavor Wildlife Research Foundation, Jackson, WY.
- Bjornlie, D. 2011. Grizzly bear use of insect aggregation sites documented from aerial telemetry and observations. Pages 33-35 in C.C. Schwartz, M. Haroldson, and K. West, eds., Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2010. U.S. Geological Survey, Bozeman, MT, USA.
- Blanchard, B.M. 1990. Relationships between whitebark pine cone production and fall grizzly bear movements. Pages 362-363 in W.C. Schmidt and K.J. McDonald, eds., Proceedings of a symposium on whitebark pine ecosystems: Ecology and management of a high-mountain resource. USDA Forest Service General Technical Report INT-270.
- Blanchard, B., and R. Knight. 1991. Movements of Yellowstone Grizzly Bears. Biological Conservation. 58:41-67.
- Boyce, M.S., B.M. Blanchard, R.R. Knight, and C. Servheen. 2001. Population viability for grizzly bear: A critical review. Interagency Association for Bear Research and Management Monograph Series 34.
- Buskirk, S.W., L.F. Ruggiero, K.B. Aubry, D.E. Pearson, J.R. Squires, and K.S. McKelvey. 1999. Comparative ecology of lynx in North America. Chapter 14 in Ecology and Conservation of Lynx in the United States the Scientific Basis for Lynx Conservation. General Technical Report RMRS-GTR-30. USDA Forest Service. Rocky Mountain Research Station.
- Cole, G.F. 1972. Grizzly bear – elk relationships in Yellowstone National Park. Journal of Wildlife Management, Vol. 36, No. 2, April 1972, pp. 556-561.
- French, S.P., M.G. French, and R.R. Knight. 1994. Grizzly bear use of army cutworm moths in the Yellowstone ecosystem. International Conference on Bear Research and Management 9:389-399.
- Gore, J. 1995. B. E. Inserts for Yellowstone Wolf/Grazing Permit Reissuance. Unpublished paper. 2 pp.
- Green, G.I., D.J. Mattson, and J.M. Peek. 1997. Spring feeding of ungulate carcasses by grizzly bears in Yellowstone National park. Journal of Wildlife Management 61:1040-1055.
- Griffin, P.C. and L.S. Mills. 2007. Precommercial thinning reduces snowshoe hare abundance in the short term. Journal of Wildlife Management. 71(2):559-564.

- Gunther, K.A. and R. Renkin. 1990. Grizzly bear predation on elk calves and other fauna of Yellowstone National Park. *International Conference bear Research and Management* 8:329-334.
- Gunther, K., B. Aber, M. Bruscino, S. Cain, K. Frey, M. Haroldson, and C. Schwartz. 2011. Grizzly bear-human conflicts in the Greater Yellowstone Ecosystem. Pages 41-44 in C.C. Schwartz, M. Haroldson and K. West, eds., *Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2010*. U.S. Geological Survey, Bozeman, MT, USA.
- Halfpenny, J., K. Murphy, and D. Reinhart. 1999. Pages 49-63 in T. Olliff, K. Legg and B. Kaeding eds., *Effects of winter recreation on wildlife of the greater Yellowstone Area: a literature review and assessment*. Report of the Greater Yellowstone Coordinating Committee. Yellowstone National Park, Wyoming. 315 pp.
- Haroldson, M.A., M.A. Terner, K.A. Gunther, and C.C. Schwartz. 2002. Grizzly bear denning chronology and movements in the Greater Yellowstone Ecosystem. *Ursus* 13:29-37.
- Haroldson, M.A., C.C. Schwartz, S. Cherry, and D. Moody. 2004. Possible effects of elk hunting on the fall distribution of grizzly bears in the Greater Yellowstone Ecosystem. *Journal of Wildlife Management* 68(1): 129-137.
- Haroldson, M. 2011. Assessing trend and estimating population size from counts of unduplicated females. Pages 10-15 in C.C. Schwartz, M. Haroldson and K. West, editors. *Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2010*. U.S. Geological Survey, Bozeman, MT, USA.
- Hilderbrand G. V., C.C. Schwartz, C. Robbins, M.E. Jacoby, T.A. Hanley, S.M. Arthur, and C. Servheen. 1999. Importance of meat, particularly salmon, to body size, population productivity, and conservation of North American brown bears. *Canadian Journal of Zoology* 77:132-138.
- Holmes, M. and N. Berg. 2009. Greater Yellowstone ecosystem lynx study. *Endeavor Wildlife Research Foundation*, Jackson, WY.
- Interagency Conservation Strategy Team. 2007. Final conservation strategy for the grizzly bear in the Greater Yellowstone Area. Missoula, Montana. 160 pp.
- Interagency Grizzly Bear Committee. 1986. *Interagency Grizzly Bear Guidelines*. USDA Forest Service. Washington, D.C. 100 pp.
- Interagency Grizzly Bear Committee. 1998. *Interagency grizzly bear committee taskforce report: Grizzly bear/motorized access management*. Missoula, Montana. 8 pp.
- Interagency Grizzly Bear Study Team. 1998. *Yellowstone Grizzly Bear Investigations, 1997*. Report of the Interagency Grizzly Bear Study Team.
- Interagency Grizzly Bear Study Team. 2000. White paper: A Report to the Yellowstone Ecosystem Subcommittee on Grizzly Bear Mortalities and Conflicts in the Greater Yellowstone Ecosystem, April 4, 2000. 15 pp.

- Interagency Grizzly Bear Study Team. 2009. Yellowstone Grizzly Bear Investigations, 2008. Report of the Interagency Grizzly Bear Study Team.
- Interagency Grizzly Bear Study Team. 2010. Yellowstone Grizzly Bear Investigations, 2009. Report of the Interagency Grizzly Bear Study Team.
- Interagency Grizzly Bear Study Team. 2011. Yellowstone Grizzly Bear Investigations, 2010. Report of the Interagency Grizzly Bear Study Team.
- Isdahl, C. 1995. Assessment on the Effects of Livestock Grazing on the Whooping Crane and its Associated Habitat within the Rocky Mountain Region. 6 pp.
- Jimenez, Mike. 2009. Personal communication with Lynette Otto, Shoshone NF Wildlife Biologist.
- Jimenez, M.D., D.W. Smith, D.R. Stahler, E. Albers, and R.F. Krischke. 2010. Wyoming Wolf Recovery 2009 Annual Report. Ecological Services. Helena: USDI Fish and Wildlife Service, 2010, pp. WY-1 to WY-28.
- Jimenez, M.D., D.W. Smith, D.R. Stahler, E. Albers, and R.F. Krischke. 2011. Wyoming Wolf Recovery 2010 Annual Report. Ecological Services. Helena: USDI Fish and Wildlife Service, 2010.
- Jimenez, M.D., D.W. Smith, S.A. Becker, D.R. Stahler, E. Stahler, M. Metz, R. McIntyre, J. Irving, R. Raymond, C. Anton, R. Kindermann, N. Bowersock, and R.F. Krischke. 2012. Wyoming Wolf Recovery 2011 Annual Report. Pages WY-1 to WY-25 in U.S. Fish and Wildlife Service Rocky Mountain Wolf Program 2011 Annual Report. USFWS, Ecological Services, 585 Shepard Way, Helena, Montana, 59601
- Judd, S.L., R.R. Knight, and B.M. Blanchard. 1986. Denning of grizzly bears in the Yellowstone National Park area. International Conference on Bear Research and Management 6:111-117.
- Kendall, K.C. 1983. Use of pine nuts by grizzly and black bears in the Yellowstone area. International Conference on Bear Research and Management 5:166-173.
- Knight, R.R. and S. Judd. 1983. Grizzly bears that kill livestock. International Conference on Bear Research and Management 5:186-190.
- Koehler, G.M. and J.D. Britell. 1990. Managing spruce-fir habitat for lynx and snowshoe hares. Journal of Forestry 88:10-14.
- Mattson, D.J., R.R. Knight, and B.M. Blanchard. 1987. The effects of developments and primary roads on grizzly bear habitat use in Yellowstone National Park, Wyoming. International Conference on bear Research and Management 7:259-273.
- Mattson, D.J., C.M. Gillin, S.A. Benson and R.R. Knight. 1991b. Bear feeding activity at alpine insect aggregation sites in the Yellowstone ecosystem. Can. J. Zool. 69: 2430-2435.
- Mattson, D.J., and R.R. Knight. 1991. Application of Cumulative Effects Analysis to the Yellowstone Grizzly Bear Population. U.S.D.I. Natl. Park Serv. Interagency Grizzly Bear Study Team Report 1991.

- Mattson, D.J., B.M. Blanchard, and R.R. Knight. 1991. Food habits of Yellowstone grizzly bears, 1977-87. *Canadian Journal of Zoology* 69:1619-1629.
- Mattson, D. J., and R.R. Knight. 1992. Spring bear use of ungulates in the Firehole River drainage of Yellowstone National Park. Pages 5-93 and 5-120 in J.D. Varley and W.G. Brewster eds., *Wolves for Yellowstone? A report to the United States Congress, Volume IV Research and Analysis*. National Park Service. Yellowstone National Park, Wyoming. 750 pp.
- Mattson, D.J., D.P. Reinhart, and B.M. Blanchard. 1992a. Variation in production and bear use of whitebark pine seeds in the Yellowstone area. In *Proceedings of plants and their environment: first biennial scientific conference on the Greater Yellowstone Ecosystem*.
- Mattson, D.J., B.M. Blanchard, and R.R. Knight. 1992b. Yellowstone grizzly bear mortality, human habituation, and whitebark pine seed crops. *Journal of Wildlife Management* 56:432-442.
- Mattson., D.J. and D.P. Reinhart. 1995. Influences of cutthroat trout (*Oncorhynchus clarki*) on behavior and reproduction of Yellowstone grizzly bears (*Ursos arctos*), 1975-1989. *Canadian Journal of Zoology* 73:2072-2079.
- Mattson, D.J., and D.P. Reinhart. 1997. Excavation of red squirrel middens by grizzly bears in the whitebark pine zone. *Journal of Applied Ecology* 34:936-940.
- Mattson, D.J. 1997. Use of ungulates by Yellowstone grizzly bears (*Ursus arctos*). *Biological Conservation* 81:161-177.
- McDonald, P. 1995. Assessment on the Effects of Livestock Grazing on the Black-footed Ferret and its associated Habitat within the Rocky Mountain Region. 5 pp.
- Mealey, Stephen P. 1979. Guidelines for Management Involving Grizzly Bears in the Greater Yellowstone Area. 136 pp.
- Mowat, G., K.G. Poole, and M. O'Donoghue. 2000. Ecology of lynx in northern Canada and Alaska. Chapter 9 in Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. *Ecology and conservation of lynx in the United States*. General Technical report RMRS-GTR-30. USDA Forest Service. Rocky Mountain Research Station.
- Packard 2003, p. 38; Brainerd et al. 2008; Mech 2006, p. 1482 in USDI Fish and Wildlife Service 2009a.
- Podruzny, S.R., S. Cherry, C.C. Schwartz, and L.A. Landenburger. 2002. Grizzly bear denning and potential conflict areas in the Greater Yellowstone Ecosystem. *Urus* 13:19-28.
- Podruzny, S. 2011. Occupancy of bear management units (BMU) by females with young. Page 16 in C.C. Schwartz, M. Haroldson and K. West, eds., *Yellowstone grizzly bear investigations: Annual report of the Interagency Grizzly Bear Study Team, 2010*. U.S. Geological Survey, Bozeman, MT, USA.
- Puchlerz, T. 1995. Biological Assessment on the Effects of Livestock Grazing on the Grizzly Bear (*Ursus arctos horribilis*). 8 pp.

- Ratner, J. 2001. Army cutworm moth sites in the Wind River Range: A preliminary survey 2001. Prepared by Bradford Environmental Research Institute under contract to the Shoshone NF.
- Ratner, J. 2003. Army cutworm moth sites in the Wind River Range: An expanded survey 2003. Prepared by Bradford Environmental Research Institute under contract to the Shoshone NF.
- Reinhart, D. P., M. A. Haroldson, D. J. Mattson, and K. A. Gunther. 2001. Effects of exotic species on Yellowstone grizzly bears. *Western North American Naturalist* 61(3):227-288.
- Renkin, R.A. and K.A. Gunther. 1996. Predicting grizzly bear mortality in developed areas of Yellowstone Park. Bear Management Office, Yellowstone Center for the Resources, Yellowstone National Park, Wyoming. 17 pp.
- Rice, J., A. Trednick, and L.A. Joyce. 2012. Climate change on the Shoshone National Forest, Wyoming: A synthesis of past climate, future climate projects and ecosystem implication. USDA Forest Service, Rocky Mtn Research Station, Fort Collins, CO. GTR-264.
- Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Forest Service Publication #R1-00-53, Missoula, MT. 142 pp.
- Schwartz, C.C., M.A. Haroldson, K.A. Gunther, and D.S. Moody. 2002. Distribution of grizzly bears in the Greater Yellowstone Ecosystem, 1990-2000. *Ursus* 13:203-212.
- Schwartz, C.C., M.A. Haroldson, and G.C. White. 2005. Reproductive performance for grizzly bears in the Greater Yellowstone Ecosystem, 1983-2002. In C.C. Schwartz, M. A. Haroldson, G.C. White, R.B. Harris, S. Cherry, K.A. Keating, D. Moody, and C. Servheen, authors. Temporal, spatial, and environmental influences on the demographics of grizzly bears in the Greater Yellowstone Ecosystem. *Wildlife Monographs*.
- Squires, J.R. and T.R. Laurion. 2000. Lynx home range and movements in Montana and Wyoming: preliminary results. Chapter 11 in Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. Ecology and conservation of lynx in the United States. General Technical report RMRS-GTR-30. USDA Forest Service. Rocky Mountain Research Station.
- Stangl, J., and M. Maj. 1995. Biological Assessment on the Effects of Livestock Grazing on the Bald Eagle (*Haliaeetus leucocephalus*). 8 pp.
- Ternent, M.A., M.A. Haroldson, D.D. Bjornlie, and D.S. Moody. 2001. Determining grizzly bear use of moth aggregation sites in the Yellowstone ecosystem. *Ursus* 14:24.
- USDA Forest Service. 2003. Documentation of the Biological Assessment process For the Proposed and Listed Species related to Commercial Livestock Grazing on the Shoshone National Forest. Shoshone National Forest. Cody, WY. 62 pp.

- USDA Forest Service. 2004. Occupancy and Use Order No. 04-00-104 Special Order—Food Storage and Sanitation. Rocky Mountain Region and Intermountain Region, Forest Service.
- USDA Forest Service. 2007. Northern Rockies Lynx Management Direction Final Environmental Impact Statement and Record of Decision. USDA Forest Service, Region 1, Region 2, and Region 4, Missoula, Montana. 534 pp.
- USDA Forest Service. 2010a. Batched Project Consultation for Relisting of the Grizzly Bear, Biological Assessment/Biological Evaluation. Shoshone National Forest. 10 pp.
- USDA Forest Service. 2010b. Biological Assessment Livestock Grazing Permit Issuance (2010) and Addendum to Documentation of the Biological Assessment Process for Proposed and Listed Species Related to Commercial Livestock Grazing on the Shoshone National Forest. Shoshone National Forest, Cody, WY. 16 pp.
- USDA Forest Service. 2011. Forest Supervisor letter to Lisa Landenberger. USGS. Bozemen, Montana. Shoshone National Forest.
- USDA Forest Service. 2011a. 2011 Amendment to the 2003 biological assessment for commercial livestock grazing on the Shoshone National Forest. Cody, WY.
- USDA Forest Service. 2012. Shoshone National Forest: Proposed Draft Plan. USDA Forest Service, Rocky Mountain Region.
- USDI Fish and Wildlife Service. 1993. Grizzly Bear Recovery Plan. Missoula MT. 181 pp.
- USDI Fish and Wildlife Service. 2003. Endangered and Threatened Wildlife and Plants; Notice of Remanded Determination of Status for the Continuous United States Distinct Population of the Canada Lynx; Clarification of Findings; Final Rule. July 3, 2003. Federal Register 68(128): 40076-40101.
- USDI Fish and Wildlife Service. 2007. Endangered and Threatened Wildlife and Plants; Final Rule Designating the Greater Yellowstone Area Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears From the Federal List of Endangered and Threatened Wildlife; 90-Day Finding on a Petition to List as Endangered the Yellowstone Distinct Population Segment of Grizzly bears. March 29, 2007. Federal Register 72(60): 14866-14938.
- USDI Fish and Wildlife Service, 2009a. Endangered and Threatened Wildlife and Plants; Final Rule to Identify the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and to Revise the List of Endangered and Threatened Wildlife. April 2, 2009. Federal Register 74, 15123-15188.
- USDI Fish and Wildlife Service. 2009b. Endangered and threatened wildlife and plants; revised designation of critical habitat for the contiguous United States distinct population segment of the Canada lynx; final rule. 50 CFR 17. Federal Register Vol. 74, No. 36. February 25, 2009.
- USDI Fish and Wildlife Service. 2010. Endangered and Threatened Wildlife and Plants; Reinstatement of Protections for the Grizzly bear in the Greater Yellowstone Ecosystem

in Compliance with Court Order, Final Rule. March 26, 2010. Federal Register 75(58):
14496-14498.

Wyoming Game and Fish Department. 2010. Wyoming wildlife action plan. Cheyenne, WY.